APRIL 7, 1958

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Selling Ideas to Bosses

STEEL presents knowhow brought out in brainstorming session with ten managers . . . Page 71

Missile Arsenal Builds Up

It represents $13 billion in sales potential to industry from now through 1960 . . . . . Page 61

Deburring with Sound

Try it when other methods are difficult or expensive. Cost savings can be enormous . . Page 102

Plastic Laminates Ride Uptrend

Easy to form, they offer style and color . . . Page 104

Part Stocks Level Out

The decline in component inventories has stopped, but a rise isn't yet in sight, either . . . Page 137

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it's mainly a matter of TIMING!

WHEN to replace a machine can mean the difference between profit and loss

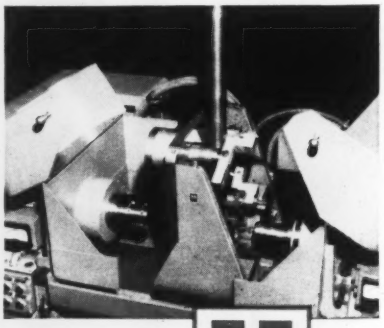
TOO EARLY is just as bad as too late. But somewhere in between there's a mathematically determinable *right time* to retire that old machine and replace it with a new one. A time when this replacement works out to your best advantage from the standpoint of production cost and capital investment.

Guess-work, intuition or rule-of-thumb computations usually come up with the wrong answer. And even carefully conceived "obsolesence formulas" may have their pitfalls. Because incorrect replacement timing, one way or the other, can *waste* thousands of dollars, this problem is of vital concern to all industry.

But Heald can help you solve it. Our sales engineers are well experienced in precise methods of replacement analysis. If you're in doubt, or would like to check your own computations, call in your Heald engineer. He will be glad to help you determine the right time to replace. And if now is too soon, he will tell you so. Similar cost studies by Heald engineers have pointed the way to many substantial savings.

For example: This new Heald Model 322 Bore-Matic replaced a heavy-duty drill for boring and chamfering hydraulic-cylinder piston rods. A cost analysis determined that the investment in a new machine could not be deferred any longer without serious financial loss. As verified by subsequent operation, the new machine offered the following savings:

	Old Machine	New Machine
Parts per hour	11	24
Machine load, per year	3,080 hrs.	1,380 hrs.
Direct & Indirect Labor	9,480 hrs.	3,240 hrs.
Annual Maintenance	$356	$100
Annual Operating Cost	$27,800	$15,000
Annual Saving, New Machine		$12,800
Net Return on Investment		39.6%



YOU pay for obsolesence. Replacement pays for itself!

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

HEALD ®

Distributors stock a large variety of Bethlehem products, and their delivery service is fast and dependable.

"Local distributors of steel are vital to our set-up"

Bernard Anderson, Treasurer, Marcus Transformer Co., Inc., Rahway, N. J.

Marcus Transformer Co., Inc., is a name well known to users of electrical equipment. As one means of coordinating production schedules and avoiding manufacturing delays, this Rahway, N. J., firm buys much of its steel from near-by distributors.

"Today," says Bernard Anderson, Treasurer, "customers demand something more than quality alone. We find that we have to be geared for speedy production and early delivery dates—and that's why local distributors of steel are vital to our set-up. Without such distributors and their big stocks and many services, we couldn't operate under our present arrangement.

"We purchase all our angles, channels, plates, and hot- and cold-rolled sheets from distributors, who furnish them cut the way we specify. This enables us to avoid big capital outlay for inventory and shear equipment. It also saves us the space that a large inventory always requires. And when we're pressed for time, we can usually get overnight service from the distributors we call.

"Another point: to a certain extent, every job we do is a custom job. Hence our month-to-month needs cannot be wholly anticipated. It's a great help to be able to order by phone, if necessary, and know that the steel will be at our door when we want it."

HERE'S WHAT THE DISTRIBUTOR OFFERS YOU. Bethlehem sheets, bars, shapes, plates, tool steel, and other steel products are stocked by distributors equipped to serve you well. Not only can the distributor be your "storage space," but he shoulders the "cost of possession"—items such as insurance, handling costs, etc. Because of his specialized machinery, he can do many things you need—like cutting, sawing, slitting. And he's always able to make delivery fast!

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Bethlehem Pacific Coast Steel Corporation, San Francisco

BETHLEHEM STEEL

Call the distributor—your Shopping Center for Steel

the beverage bar with a "brain"... of Stainless Steel

The "brain" in this coin-operated soda dispenser is a valve that works round the clock to see that you get soda . . . or your money back.

It's an ingenious unit that automatically shuts off if the system fails — or the tank is emptied. Then too, it provides a device that bleeds air after each refill . . . and a precise mechanism that equalizes pressure to assure a uniform drink. Sanitary and corrosion-proof, all its working parts are made of stainless steels — not just one steel, but *four.*

The plunger and stop are Type 430F bar (magnetic) . . . the spring is 302 wire (non-magnetic) . . . the probe is 303 bar (machinability) . . . and the cylinder is 304 *welded* tube (economy). Despite this mixed requirement, *all* 4 grades are supplied *overnight* by Frasse.

You'll find it simpler, when working with stainless steels, to work from Frasse warehouse stocks. The wide range of sizes, shapes and analyses, so quickly available from this single source, is a time and effort saving convenience. For stainless steels . . . *always* call Frasse *first.*

Call FRASSE 1st for

COMPLETE STAINLESS STEEL SERVICE

Bars	**Wire**
Forgings	**Tubing**
Sheets	**Pipe**
Strip	**Fittings**
Plates	**Valves**

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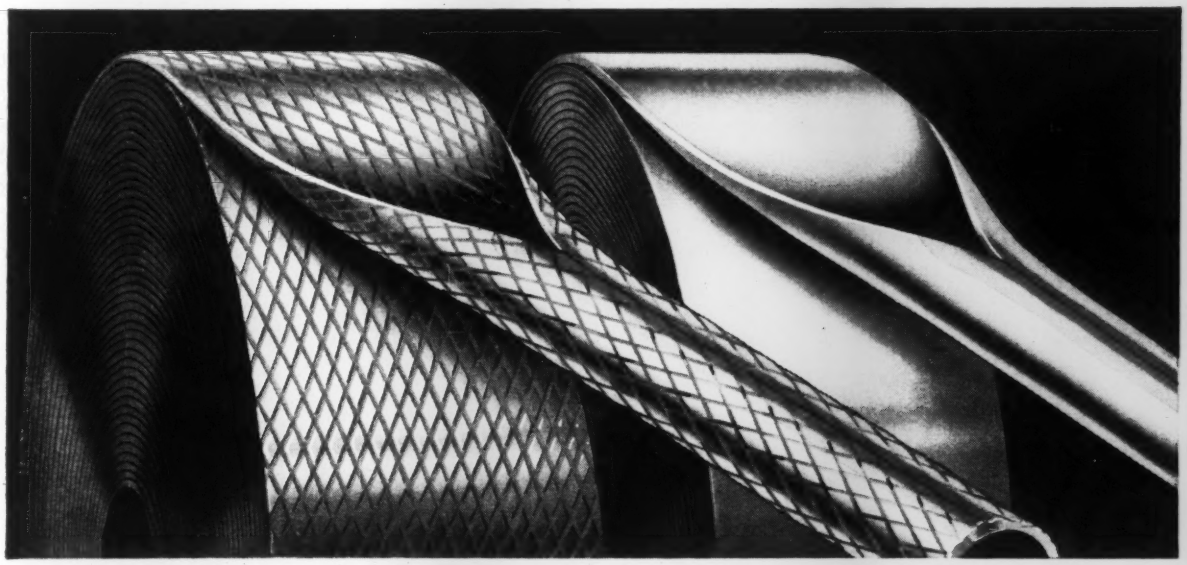
HARTFORD 1, CONN.
P. O. Box 1949
JAckson 9-6861

LYNDHURST, N. J. • ROCHESTER, N. Y.

Now... Aluminum Tubing... plain or patterned...Welded

with TOCCO* *High-Frequency Heating*



Quaker State Metals Company, leading fabricator of aluminum building products, recently installed a 25 kw, 450,000 cycle TOCCOtron vacuum tube oscillator for continuous welding of aluminum tubing. Both plain and patterned strip, anodized or untreated according to end-use requirements, is continuously welded. Diameters vary from ½" to 1" O. D. and wall thicknesses from .024 to .064".

The weld is absolutely uniform throughout the entire length, assuring a dependable, strong bond. The whole operation is so smooth and quiet, you hardly know it's running.

Aside from the perfect weld, for the ultimate in product quality, TOCCO Induction Welding, being a completely automatic process, saves time and money over many conventional joining methods.

Remember, whether *your* products are of ferrous or non-ferrous metals, TOCCO can almost certainly save *you* time and money in heat-treating, brazing, welding, or hot forming operations.

***Mail Coupon Today*— NEW FREE Bulletin**

The Ohio Crankshaft Co. • Dept. S-4, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Heating".

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Position_____

Company_____

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City_____ **Zone**____ **State**_____

THE

A B C

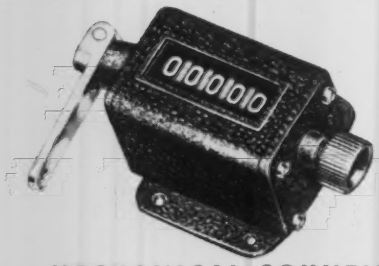
OF

1 2 3

Why is COUNTROL

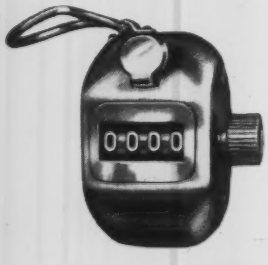
important in every business today?

Countless times a day, every business needs to know "how many? . . . how much? . . . how far? . . ." and many other questions that can be answered only by facts-in-figures. But how to get these figures . . . from so many different machines, processes, operations and systems? Veeder-Root Counters are doing it every day, by means of:



MECHANICAL COUNTING

Small Resets count strokes, turns, or pieces . . . are used by thousands for moderate duty in parts inspection, quality control, conveyors, machine tools, light presses, etc.



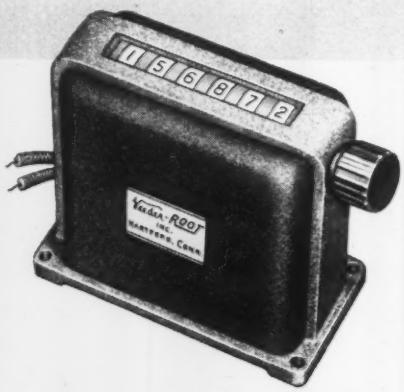
HAND COUNTING

Where objects or units cannot be counted electrically or mechanically, hand-operated counters like this Hand Tally do the job. For instance, quick spot checks of production or performance, traffic count, inventory, etc. Fits palm of hand, counts one for each pressure of thumb lever, resets to zero by turning knob.

Insist on Standard

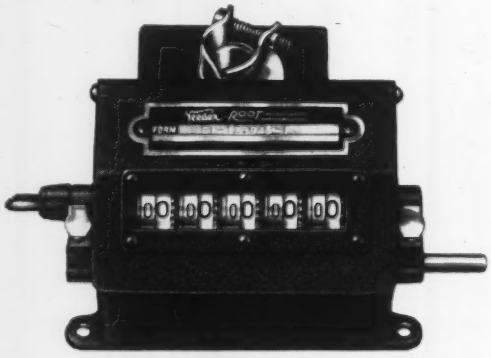
VEEDER-ROOT COUNTERS

from your Industrial Supply Distributor



ELECTRICAL COUNTING

These remote-indicating counters bring your production machines as close as your office wall. AC or DC, they can be connected in series with any simple switch, and will transmit production figures *instantly* over any distance. May be panel-mounted in groups.



CONTROLLING

Set it for the exact number of turns, pieces, or operations required . . . and this Predetermining Counter will control the run *exactly* . . . preventing over-runs and shortages. When the predetermined number is reached, counter will light a light, ring a bell, or actuate a stop-motion.

IN SUM: *If it can be counted or controlled . . . count on Veeder-Root to do it. Get in touch with your Industrial Supply Distributor for standard counters for application to your production machines and processes. And get in touch with Veeder-Root for counters to be built into original equipment.* **Veeder-Root Inc., Hartford 2, Connecticut.**

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April 7, 1958
Vol. 142 No. 14

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Unemployment is still rising, but don't be misled by the bare statistics. They need explanation.

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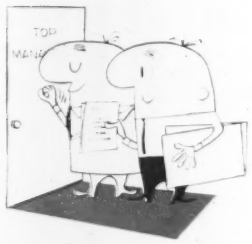

How To Sell Ideas to Bosses—Top management must clear channels of communication so that ideas can flow freely from originators in the lower echelons.

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Purchasing agents confirm belief that business downtrend is near bottom. As orders firm, so does employment.

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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1958 by Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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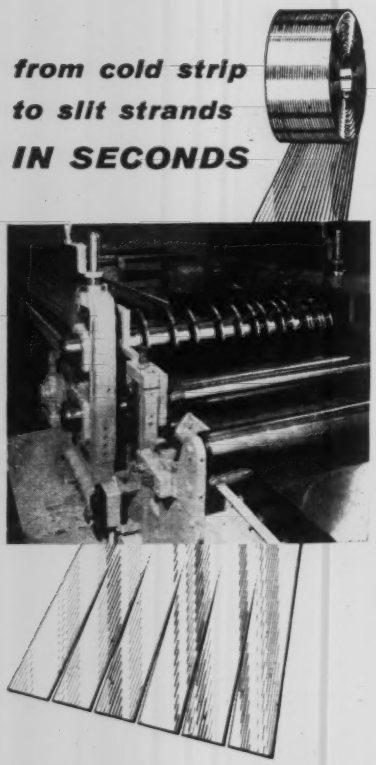
from cold strip
to slit strands
IN SECONDS



YODER ROTARY MULTIPLE SLITTERS

A Yoder slitter converts mill-width coils of flat-rolled metal into many variable-width strands in amazingly short time. Speed, coupled with great accuracy and low manpower requirements, makes a Yoder slitter an important factor in keeping production and overhead costs down.

Operated by only two men, the Yoder Type 3-48 slitter illustrated is designed to accommodate standard mill-width coils up to 48 inches wide, in a variety of metals and thicknesses. The slit strand widths can be held to within a .004" tolerance.

Even if your steel requirements are as little as 100 tons a month, the savings to be realized in time, manpower and raw material costs alone will pay for a Yoder slitter in the first few months of operation.

There is a Yoder slitter designed and engineered to meet your requirements, and to speed the delivery of "special" width stock in a wide range of large or small sizes. Send for your free copy of the fully-illustrated, 76-page booklet, "Multiple Rotary Slitting Lines."

THE YODER COMPANY
5502 Walworth Avenue • Cleveland 2, Ohio

ENGINEERING YODER MANUFACTURING
ROTARY SLITTING LINES

behind the scenes

High Level Brainstorming

When you get to Page 71 you'll find an interesting report of a Brainstorming Session that was staged Mar. 18 at Cleveland's Union Club. Sponsored by STEEL, it was calculated to reveal methods by which secondary management could sell ideas to top brass. When in the course of human events it becomes necessary for an employee to approach the top dog in his organization with an idea to improve production or reduce costs, he simply can't barge in and shout: "Hey, Mac, get the lead out and open your eyes! You're running this outfit into the ground, know what I mean? Now here's a sharp idea I got that'll save you from the mess you're making. . ."

Editor Walt Campbell was much concerned about the obstacles, real and psychological, that loom between an employee with an idea and a management that won't listen. "In the current Cost Crisis," Mr. Campbell remarked, "we can't afford to overlook any access to the problem. Maybe we ought to assemble some middle and top management people and try to find through brainstorming how they may be best approached."

Search for Quarters

The Penton Building contains some nicely appointed offices and adequate conference rooms, but Editor Campbell preferred more formidable surroundings for the distinguished guests he aimed to invite. In a word, he wanted to go whole hog, so he presented himself to George O. Hays, president of the Penton Publishing Co., publisher of STEEL, and outlined his brainstorming scheme. "Our guests will be eminent persons," he explained. "I wonder where we can meet?"

"I have it!" exclaimed Mr. Hays brightly. "We can meet at the Union Club! You can all be my guests."

"The Union Club!" Walt echoed. "Splendid!"

It really was splendid, too, because the Union Club is more than just an impressive building full of oil paintings, and rich carpeting, and leather chairs, and private parlors and soft-footed attendants: It is one of the most respectable and distinguished clubs in the U. S., and was founded 86 years ago as a "club where companionable and cultured gentlemen could meet in greater quiet to discuss topics of the day."

Well, the companionable and cultured gentlemen Campbell rounded up to take advantage of Mr. Hays's invitation were industrial hot shots, but according to Associate Managing Editor John Morgan, they didn't meet in "greater quiet." "They started at the opening bell," said John, "and they didn't relax for a second. You see, our machine tool editor, Bob Huber, and I were primed to throw in suggestions in the event that the flow of ideas slowed to a trickle, but we never had a chance. That group was really terrific."

Industrial News Beat

Two news releases crossed our desk this week—or was it last week? Fundamentally an old cod fisherman, we are scarcely geared to cope with the startling and fantastic industrial news that floods our coop in the form of publicity. We doubt if members of the public relations fraternity would turn handsprings on receipt of intelligence revealing that their squibs had been published in this column, so it's probably safe to consider two samples of their work.

Up in Racine, Wis., the Webster Electric Co. recently perfected a Stereo Ceramic cartridge, and if you don't know what a Stereo Ceramic cartridge is, that's your fault. Anyway, it is a small lightweight deal, has a diamond point, replaceable stylus, and is a plug-in type that fits any standard record player or changer. The line that intrigued us was this: "The company anticipates a booming market for these cartridges."

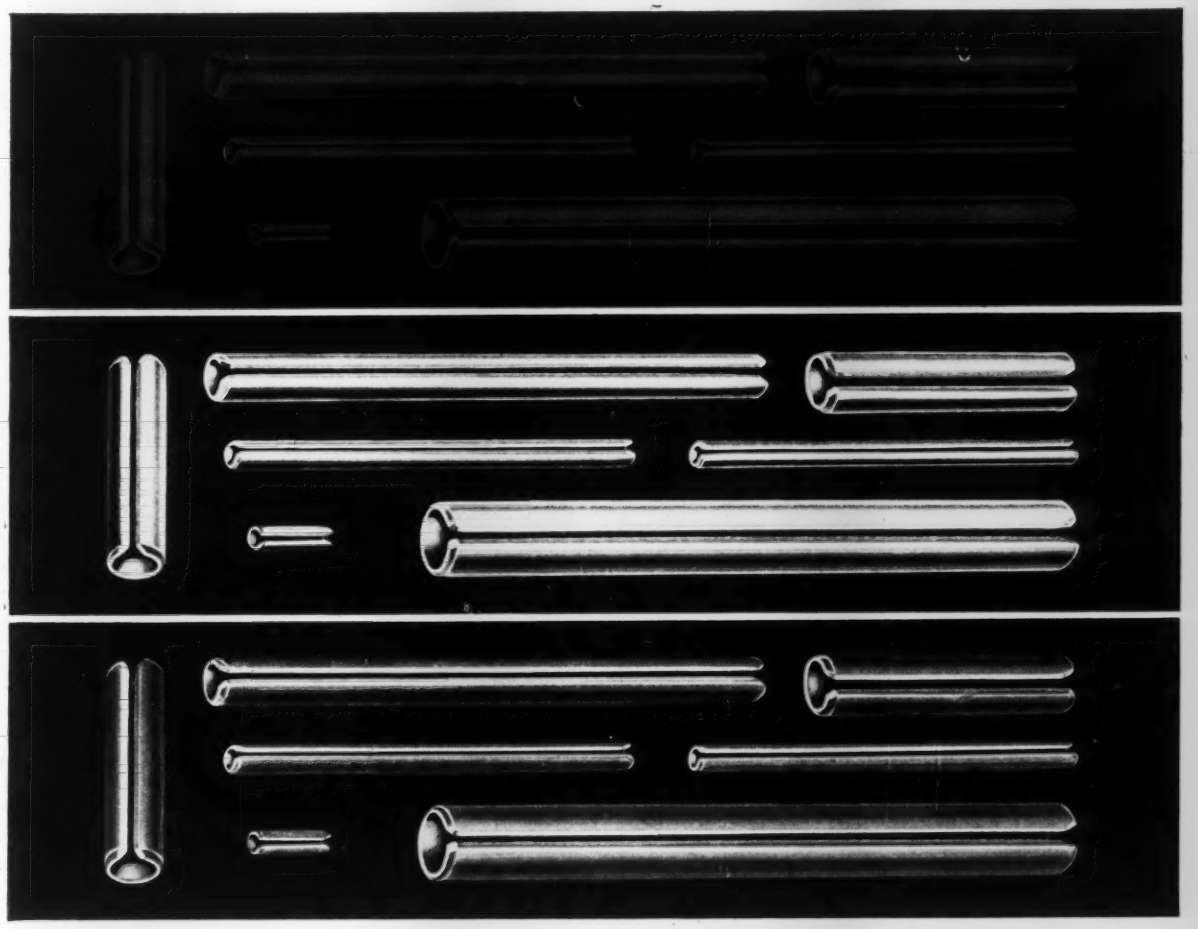
The second item was short, but fraught with something or other. It's silly to suggest to our intelligent readers that "fraught" used to be spelled "vracht," and that it comes to us from Middle Dutch, but we'd like to make a motion that both spellings be abandoned. The item that is vracht—or fraught—with something concerns the Chemical Machinery Div. of Baker Perkins Inc., Saginaw, Mich., for many years a prime supplier of chemical processing equipment. It reports that it is now tooled up for full scale production of special equipment for mixing solid rocket and missile fuels. Think of a civilization that can calmy view the activities of an industrial organization that produces pots and paddles for mixing stuff that could literally shoot you to the moon!

Fragile Fractions

If the denominator of a certain fraction is 5 more than the numerator, and if 3 is added to both terms of the fraction, the resulting fraction will equal ½. What, pray tell, was the original certain fraction?

Shrdlu

(Metalworking Outlook—Page 53)



What are your Rollpin® requirements...

Corrosion-resistant steel, beryllium copper, or carbon steel? An "available" fastener with better than 90% of the catalogued size and length combinations obtainable from stock? A fastener with consistent dimensional quality control and fully dependable strength and vibration performance? A fastener that costs less than most of the pin type fasteners it replaces . . . and cuts assembly costs too?

Slotted, chamfered, cylindrical Rollpin spring-pins meet these requirements and many others. Available Rollpin inventory stands at tens of millions of pieces. Rollpin performance is consistently high because uniform shear strength, dimensions and hardness are guaranteed by high ESNA quality control standards. Investigate installed Rollpin costs as compared to grooved-type pins, taper pins, precision dowels and many types of rivets.

Standard Rollpins are made from carbon steel and Type 420 corrosion-resistant steel in stock sizes from .062″ diameter to .500″. Cadmium, zinc or phosphate finishes may be specified. They're also available in beryllium copper for applications requiring exceptional resistance to corrosion, and anti-magnetic and non-sparking properties—in diameters from .062″ to .250″.

Why not simplify and speed up your orders by sending for data on all the Rollpin sizes and materials today? Elastic Stop Nut Corporation of America, Dept. R46-460, 2330 Vauxhall Road, Union, New Jersey.

ELASTIC STOP NUT ESNA CORPORATION OF AMERICA

Studs for NELWELD® process machined from Youngstown cold finished bars

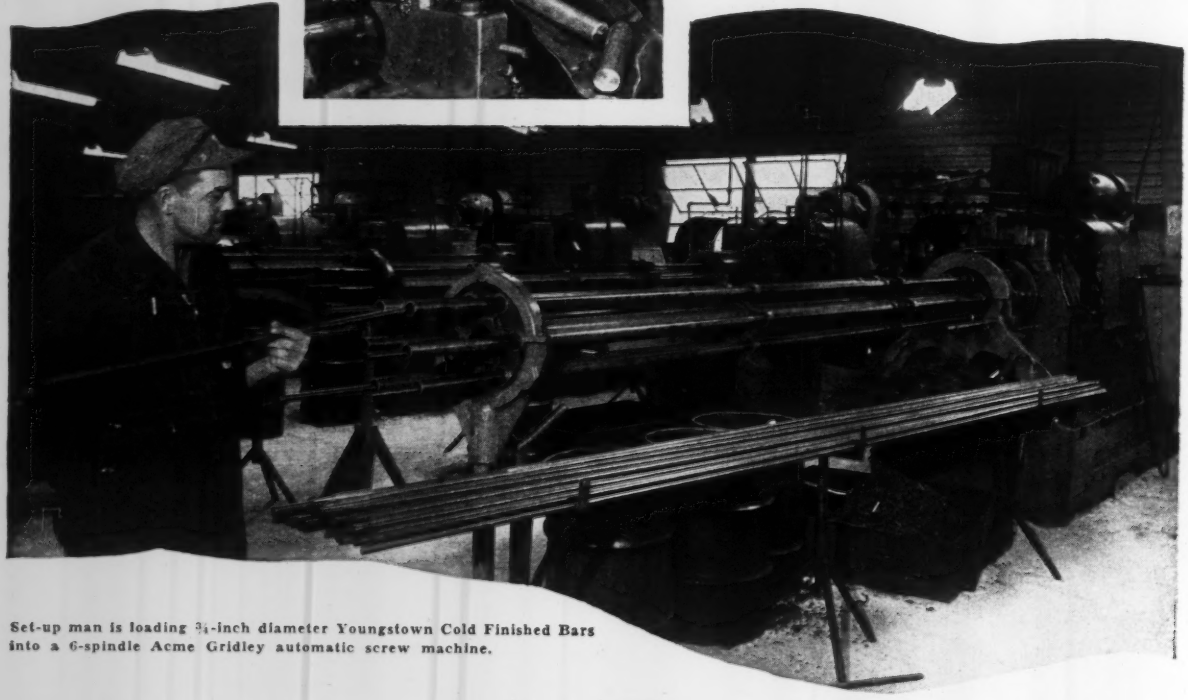
Progressive fabricators rely on the Nelweld method for fast, dependable end-welding of studs to steel surfaces. This novel electric arc process—utilizing flux-filled steel studs—substantially reduces direct fastening costs when used to replace conventional time-consuming methods such as drilling, tapping, hard welding, through-bolting or the securing of straps and rivets.

To maintain their world-wide reputation for product quality and uniformity, Nelson Stud Welding, a division of Gregory Industries, Inc., uses Youngstown Cold Finished Bars as the basic material for stud production.

Youngstown Cold Finished Bars provide high machinability and greater uniformity of composition, structure and surface finish to help you increase production of more uniform parts. Always specify Youngstown—it's your best assurance of quality.

Why not call or write your nearest Youngstown District Sales Office today for additional information or metallurgical assistance?

Close-up of studs being bored to accomodate their charge of flux (top collet) and then cut-off (center collet). Two finished Nelweld studs, shown in the pan in foreground, were machined simultaneously in the 6-position machine. First operation—feed out and face; second—bore; and third—cut-off.



Set-up man is loading 3¼-inch diameter Youngstown Cold Finished Bars into a 6-spindle Acme Gridley automatic screw machine.

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

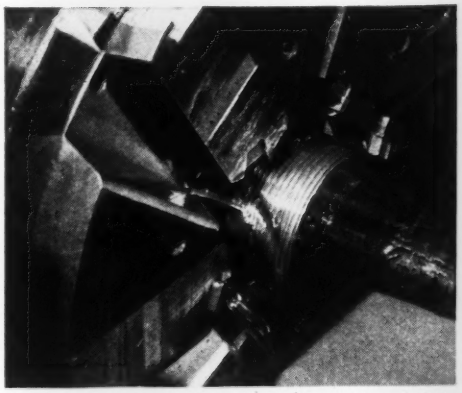
QUALITY YOUNGSTOWN SERVICE

Cold finished bars

JOE IS DETERMINED TO SEE EVERY STEP OF THAT PRECISION CUTTING JOB.
WE'D SAVE MONEY BY GETTING HIM SOME TRANSPARENT SUNICUT.
LOCKE

For precision cutting...

TRANSPARENT SUNICUT OILS ASSURE YOU GOOD VISIBILITY, PEAK PRODUCTION



Transparent Sunicut oils assure excellent finish in critical operations at close tolerances. Good visibility speeds production.

Transparent Sunicut® oils, including heavy-duty and dual-purpose oils, are available in many grades to suit your specific needs. They give outstanding results...especially where precision cutting is required.

Their transparency takes the "blinders" from work that needs close watching, permitting close product control, faster production, lower unit cost. Machine operators like Sunicut's "cleanliness." Most important, *transparent Sunicut oils assure you of good finishes.*

For full information about Sunicut cutting oils, call your Sun representative, or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-4.

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SUN OIL COMPANY

Philadelphia 3, Pa.

In Canada: Sun Oil Company Limited, Toronto and Montreal

SUNOCO®

©Sun Oil Company

from blueprint to product in 5 minutes

with the STRIPPIT

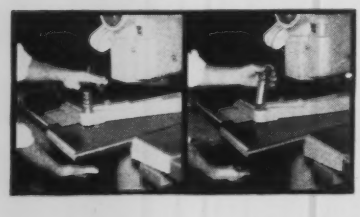
FABRICATOR

THE STRIPPIT FABRICATOR — a single compact multi-purpose Punch Press with quick-change tool holder, quick-set gauging and stops.

Short run? Complicated pattern? If it's sheet metal up to ¼" mild steel, if it's punching, notching or nibbling, it's profitable on a Strippit Fabricator!

Set up in minutes! Punches and dies are changed in 30 seconds or less, and Strippit guided punches need no aligning or adjusting. Back stop with precision gauge is instantly set by a locking knob. Self-tripping finger stops on gauge bars provide multiple stopping as the work is moved rapidly under the punch. A switch gives you single punching or 165-stroke-a-minute nibbling, and all tools are within quick reach in attached "file drawers" or shelves. The Fabricator is more than a one-machine shop — it's a whole system of quick-change, high-profit fabrication used by thousands of shops.

What's more, you can add the Strippit Positive Duplicator for high-speed punching in medium runs — plus the Dupl-O-Scope to punch Duplicator templates right from the drawing, in a few minutes. Write today for details and demonstration at your plant by the Strippit mobile unit. Warehouse stocks in Chicago and Los Angeles.



TOOL HOLDER is pulled out, for instant removal of die and punch assembly, ready for the next interchangeable tool. 1¼" diameter capacity holder shown. 3½" diameter holder also available.

A UNIT OF HOUDAILLE INDUSTRIES, INC.

WALES STRIPPIT COMPANY

210 Buell Road, Akron, New York

In Canada: Strippit Tool & Machine Limited, Brampton, Ontario

LETTERS TO THE EDITORS

Cost Crisis Series: Valuable

I think your Cost Crisis series of stories is performing a needed and valuable function in the industry. Incidentally, two good-sized companies requested quotations on our equipment described in your article, "Automatic Welder Saves 66 Per Cent" (Feb. 24, Page 72).

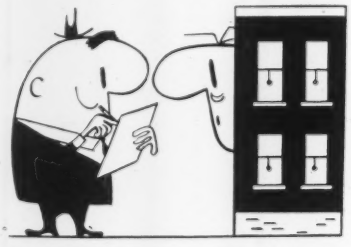
Eugene D. White
Field Sales Manager
Lewis Welding & Engineering Corp.
Bedford, Ohio

Data Helpful to Supervisors

Your Program for Management article, "Production Control for Profits" (Mar. 17, Page 83), contains a great deal of information needed by our reorganized production control group. It should be extremely helpful to our newly assigned supervisory people.

H. S. Wright
Supervisor, Scheduling & Order Release
Summers Gyroscope Co.
Santa Monica, Calif.

Houston Steel Scrap Report



It is gratifying to see that you include Houston in your weekly iron and steel scrap prices report. This, of course, makes your magazine even more desirable.

Robert H. Lang
Lufkin Foundry & Machine Co.
Lufkin, Tex.

Disagrees with Ruttenberg

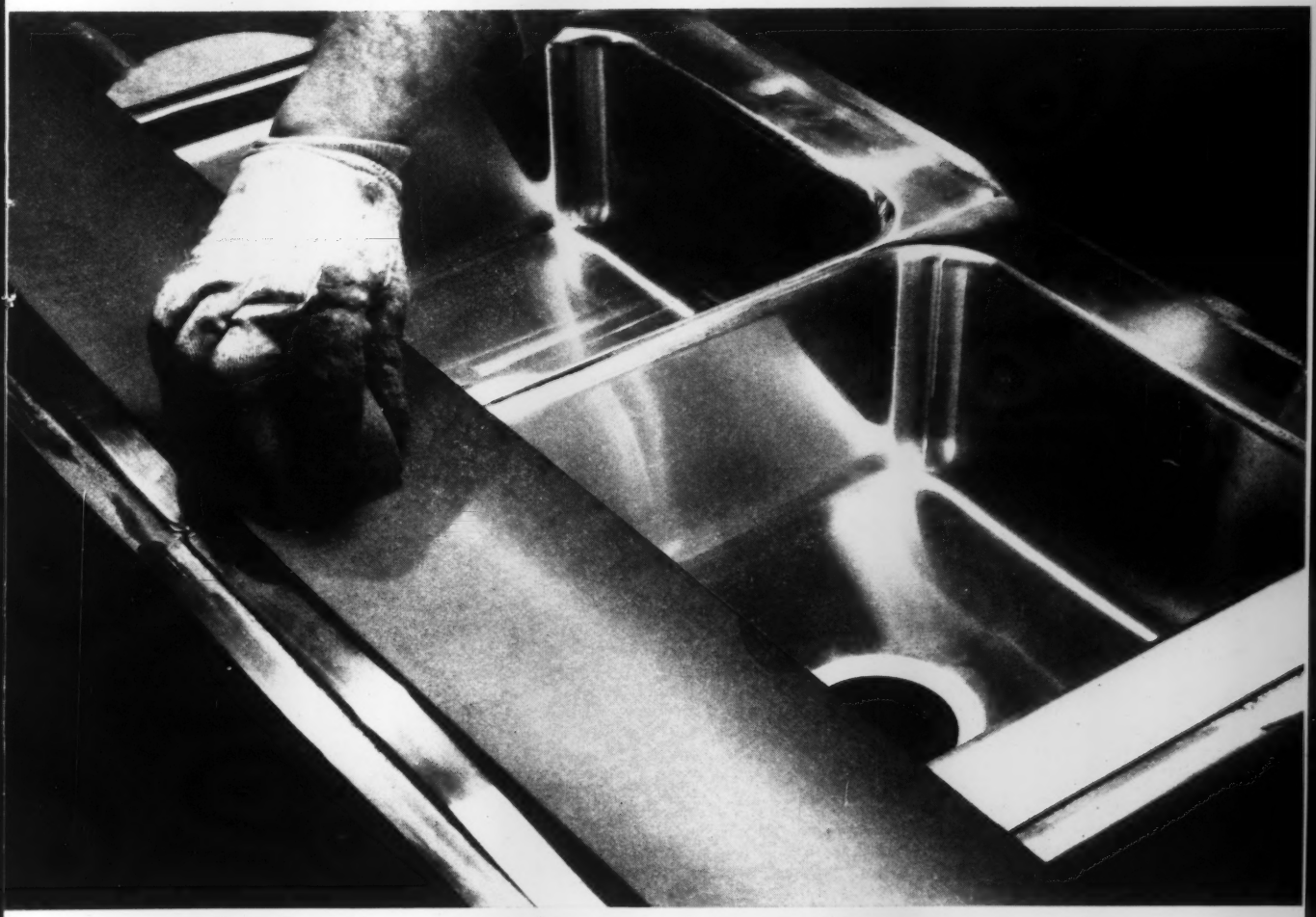
Referring to your article, "Union Methods Are Outdated" (Feb. 17, Page 78), there is no doubt that union methods are outdated. Harold Ruttenberg's solution, however desirable, is not realistic except for specific industries at specific times.

Productivity, except in good times, is not necessarily desired in many industries. One of these would be the auto industry. Most auto manufacturers are reducing their production and, in turn, their manpower. In most cases, the plants affected know the approximate level of manpower required to produce a required number of units. Company budgets are based on the standards used to arrive at these levels.

Mr. Ruttenberg's proposal would suggest that either: 1. The standards are too high and fewer men should be able to do the job, with a monetary increase because of their greater productivity. 2. Or the

(Please turn to Page 12)

Stainless Steel
polishing information:



*Play it cool and don't press

You can polish Stainless Steel to a mirror finish but you can't rush the job. Too coarse a grit, too much speed, too much pressure might scorch or discolor Stainless because steels of this family are not rapid heat conductors.

Use light pressure on the polishing agent, and remember that you can't get a desired finish any faster just because you press harder. Take your time. This is by way of saying that Stainless Steel isn't difficult to fabricate, it's just different.

All your work on Stainless will be expert if you follow the "Stainless Steel Fabrication Book." If you don't have a copy, we'll be glad to send you one. Write on your company letterhead to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS is a registered trademark

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American Steel & Wire–Cleveland
Columbia-Geneva Steel–San Francisco
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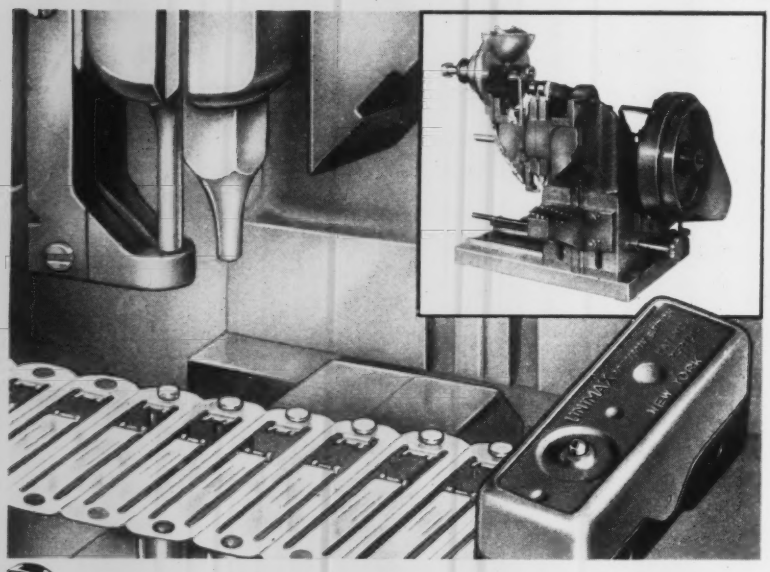
USS United States Steel

ELIMINATE PUNCH-PRESS—SAVE 50%



Tubular's DOUBLE-DRIVE RIVETER HELPS UNIMAX* ON SWITCH ASSEMBLY

50% Saved is 50% Earned

At Unimax, the problem of holding close tolerances in high-speed assembly of precision switches was solved by Tubular Rivet & Stud engineers. Previously, the silver contact was set on one machine and "coined"† on a punch-press. Because there can be no distortion of the spring element, and overall tolerances of the coined contact must be held to ±.001 inches, assembly was slow, and ***Tubular*** was brought into the picture.

The ingenious application of a ***Tubular*** 104-T double-drive machine eliminated the punch-press operation and made a 50% saving in time and assembly cost.

The double-drive machine performs as follows: The machine head with the hopper attached automatically feeds a contact into the jaws, guides it through the spring element and sets it on a spring pin anvil. During the next and subsequent cycles this operation is repeated. At the same time, the adjacent head is completing the operation on the set contact, coining it on the anvil at high speed while holding the specified tolerances.

* Unimax of Wallingford

Unimax Switch Division of The W. L. Maxson Corporation is located at Wallingford, Connecticut. Unimax precision snap-acting switches find wide use in modern control systems. Their current-handling ability and compactness simplify construction of complex electric controls and their availability in varied actuator styles gives the designer wide choice of operating means.

TUBULAR of Quincy

You may not be assembling switches but if your problem can be solved with riveting equipment, ***Tubular*** can do it. Call our nearest office or send us your blue print for complete information and technical help.

† "Coining" is the process of embossing designs, patterns or ridges on metal by completely trapping the blank between dies and applying pressure. (Coining definition from "The New American Machinists" Handbook 1955)

SEE US AT BOOTH NO. 1717 • ASTE SHOW

Tubular Rivet & STUD COMPANY
QUINCY 70, MASS.

FASTEN AUTOMATICALLY BETTER and FASTER with TUBULAR'S RIVETS and MACHINES

MIDWEST OFFICE & WAREHOUSE — CHICAGO

BRANCH OFFICES: ATLANTA • BUFFALO • CHARLOTTE • DALLAS • DETROIT INDIANAPOLIS • LOS ANGELES • NEW YORK CITY • PHILADELPHIA • ST. LOUIS • SEATTLE •

See your local classified directory for phone numbers

LETTERS

(Concluded from Page 10)

budgeted manpower figure is correct, and the additional higher wages would put the firm over budget, dollarwise.

The second alternative is obviously detrimental to the firm, while the first would not be a true assumption. This leaves us without a true measure for productivity.

A more realistic method of awarding higher wages is to base it on profits, not productivity. Walter Reuther's proposal of profit sharing with employees, though going beyond attainable limits as stated, would be one solution. However, the "bonuses" should be figured on individual plant bases rather than company-wide. This would create incentives at each location to reduce cost.

Fred B. Bialek
Mfg. Standards Engineer
Los Angeles Assembly Plant
Mercury Div., Ford Motor Co.
Rivera, Calif.

Reading in Reception Room

While waiting in the reception room of the Bethlehem Steel Co., Bethlehem, Pa., this morning, I read with interest your article, "Direct Reduction Is Closer" (Mar. 17, Page 102). We would appreciate a reprint.

P. H. Shober
Assistant General Sales Manager
General Coal Co.
Philadelphia

Wrong Tense Used

Grammatically speaking, tense makes a big difference in a statement. For example, look at the item about Carl Stugard in your Men of Industry Department (Mar. 17 issue, Page 68). After noting his election as a vice president, you say: "He was manager, special machine tool division." As a matter of record, Mr. Stugard is both a vice president and the manager of the special machine tool division.

Henry Dods
Technical & Service Publications Dept.
Cincinnati Milling Machine Co.
Cincinnati

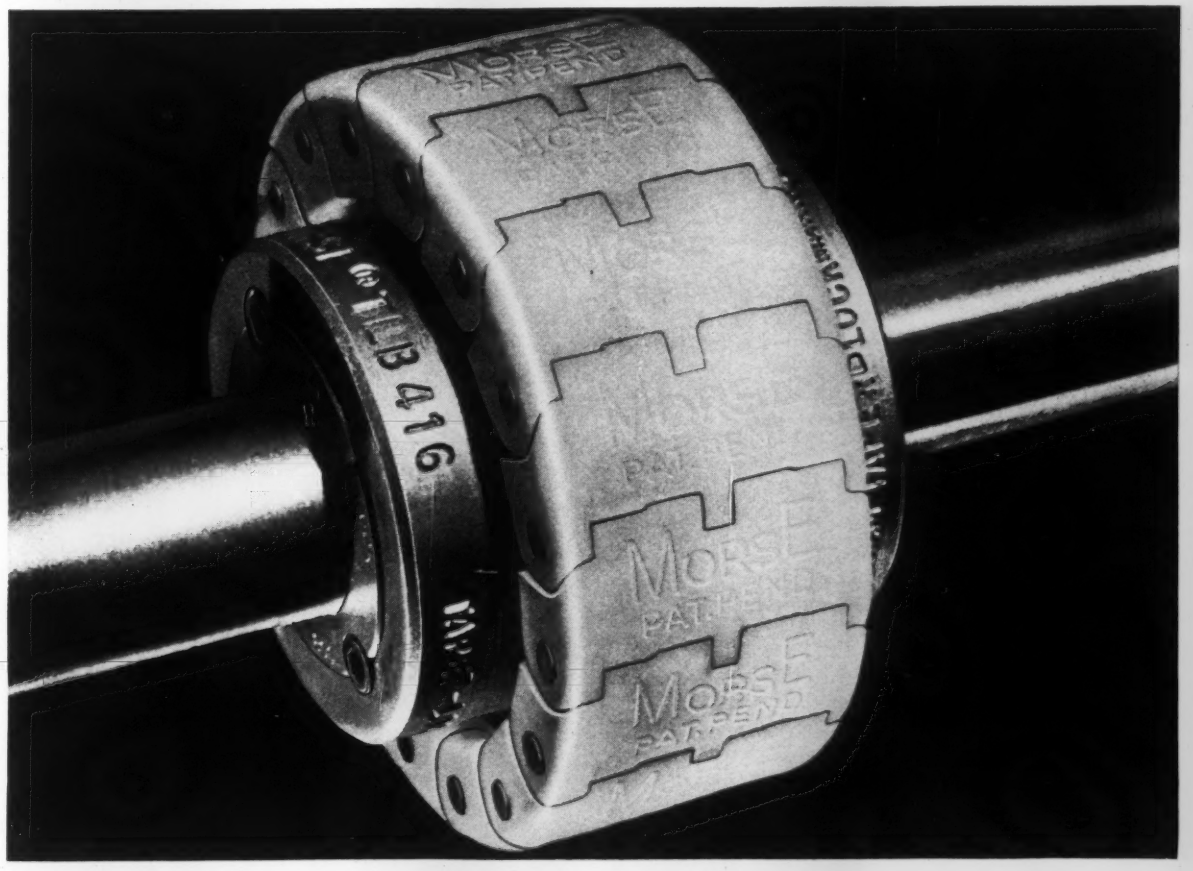
What's Nuclear Power Cost?

Cost per kilowatt of electricity from nuclear reactors is not covered in your article, "Russia Lags in Atom Race" (Jan. 13, Page 46). As an Engineers' Club, we are interested because the Rural Cooperative Electrical Association of Elk River, Minn., is going to install a reactor, starting sometime the last part of 1958. Do you have any information on cost?

Clarence Livgard
President
Federal Cartridge Corp. Engineers' Club
Anoka, Minn.

• *Westinghouse Electric Corp. estimates that the cost per kilowatt hour is 6.4 cents at its Shippingport, Pa., atomic power station. The world's first large scale nuclear electric plant devoted exclusively to peaceful uses, it first produced electricity on Dec. 18, 1957.*

Now...from Morse Chain



New Nylon Couplings

Cost 20% less, need no lubrication, last indefinitely!

New Morse Nylon Flexible Couplings cost less to buy and maintain than steel couplings. They use economical, stock roller chain sprockets—need no protective cover. They last longer, too . . . operate without lubrication because friction and wear are negligible.

Order complete couplings—½" pitch links plus stock sprockets (plain, finished bore, or taper-lock)—or buy just the links and use your own sprockets. Morse Nylon Couplings, made of Du Pont "Zytel" resin, are ideal for loads from fractional to 40 h.p. and speeds from 500 to 5000 rpm. And they adjust to misalignment.

For facts on Nylon Couplings, or the other couplings in the most complete line ever offered, call your local Morse Distributor. He's listed in the Yellow Pages under "Power Transmission". Or write: MORSE CHAIN COMPANY, DEPT. 2-48, ITHACA, NEW YORK. Export Sales: Borg-Warner International, Chicago 3, Illinois.

IN POWER TRANSMISSION
THE TOUGH JOBS COME TO

MORSE BW*

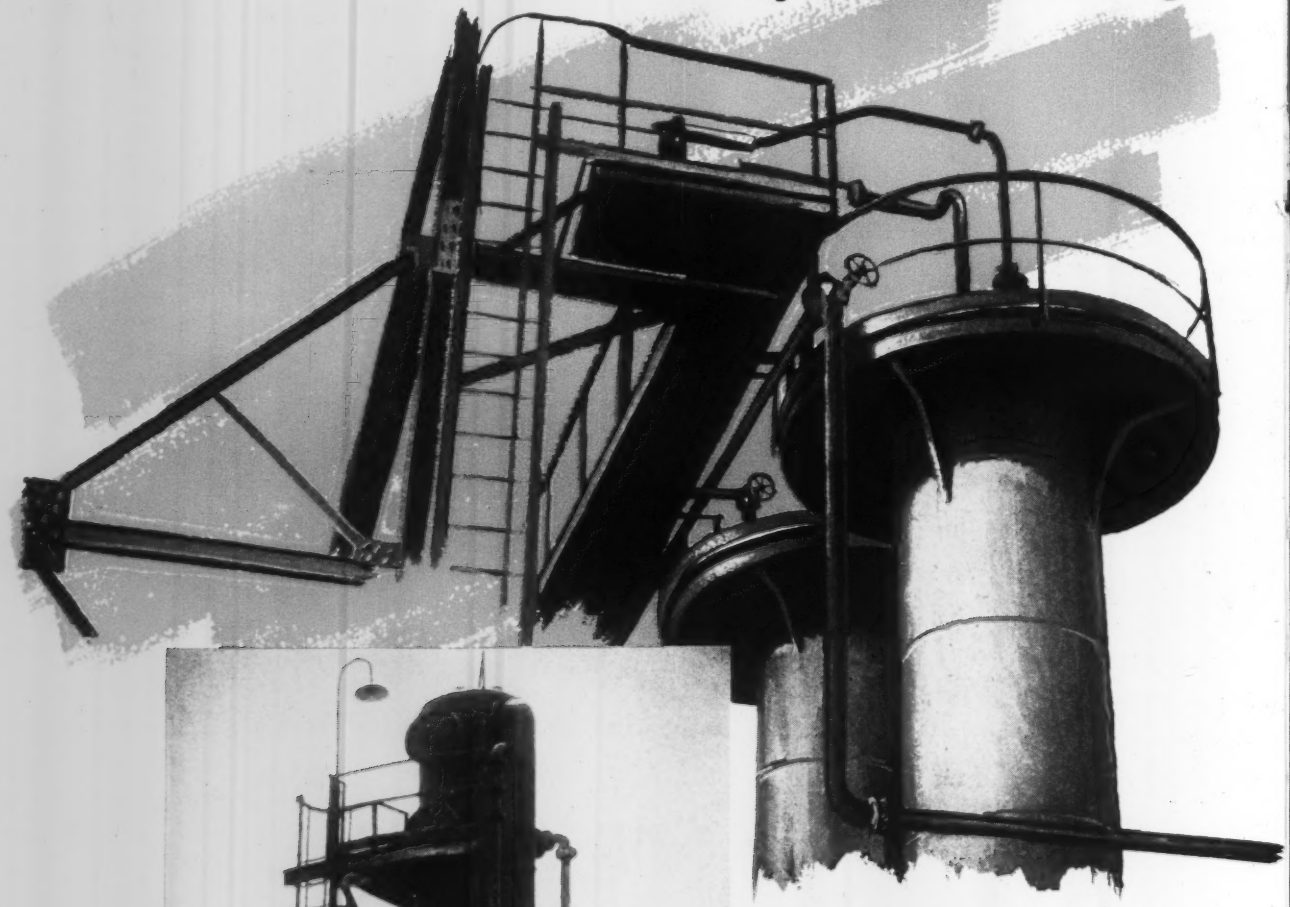
*Trademark

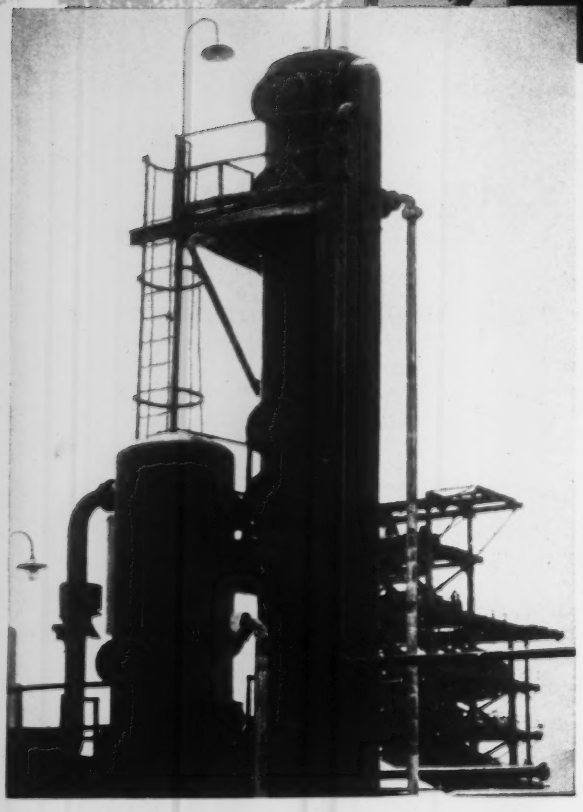
REMEMBER: Only Morse offers all four flexible couplings: Chain, Morflex and Radial, Morflex and Radial Driveshafts, and Nylon

Visit Morse at the Design Engineering Show in Chicago, April 14-17, Booth 945-949

HEAT • WEAR • CORROSION

HAYNES Alloys solve the *tough*



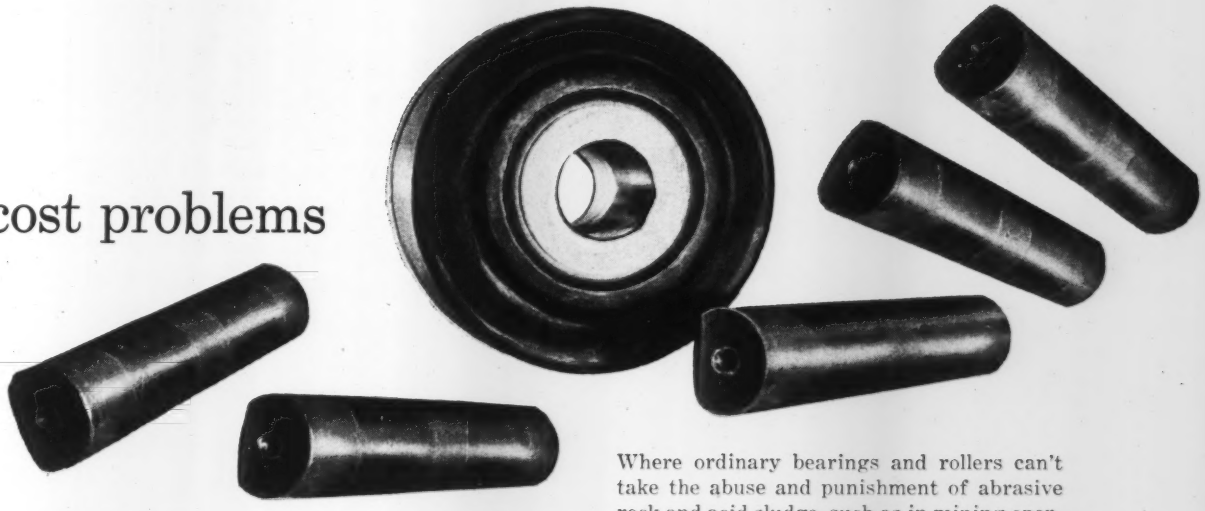


CORROSION

HASTELLOY Alloy B has a service life 30 to 40 times that of ordinary materials while handling highly reactive hydrogen chloride gas at a chemical plant.

In petroleum, chemical, or food processing industries—wherever you find highly corrosive conditions—HAYNES Alloys are long-wearing and most economical.

cost problems

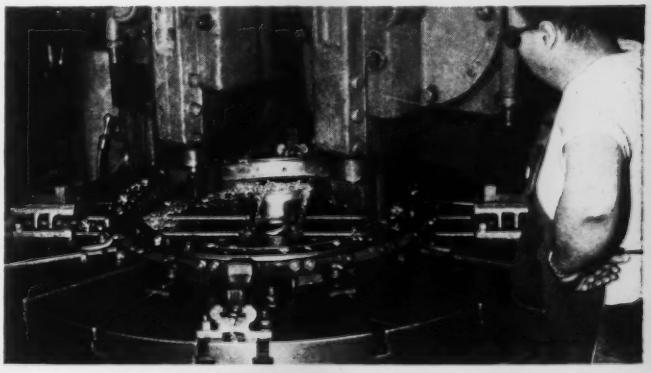


ABRASION

Where ordinary bearings and rollers can't take the abuse and punishment of abrasive rock and acid sludge, such as in mining operations, they are hard-faced with HAYNES STELLITE Alloy No. 6 and last for years instead of weeks! HAYNES Alloys reduce maintenance and replacement costs by giving long service.

Wherever you have a *tough* cost problem due to maintenance or replacement expense caused by excessive wear, heat, or corrosion, or where there is a complex design or production problem—investigate the use of HAYNES Alloys.

In practically every industry, you will find HAYNES Alloys helping to increase production and reduce maintenance—doing an efficient job at low cost. For information on HAYNES Alloys, contact our nearest sales office or write HAYNES STELLITE COMPANY, Division of Union Carbide Corporation, General Offices and Works, Kokomo, Indiana. Sales Offices in Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, and San Francisco.



MACHINING

HAYNES STELLITE 98M2 alloy tools remove metal fast in machining jet engine diaphragm rings. These tools take a ½-in. cut and remove 55 cubic in. of metal in 15 minutes. About six rings now are machined per grind where other tools failed to finish even one. And tool service life has jumped over 600 per cent. Fast, precision machining with long tool life makes a big difference in production costs.

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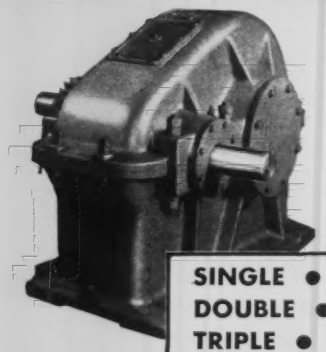
Continuous Tooth

HERRINGBONE GEAR SPEED REDUCER



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The Gear with the Backbone •

Proven On-the-Job Advantages of This Type of Gear Reduction

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4. More silent and smoother gear action.
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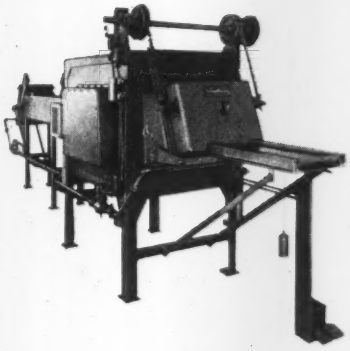
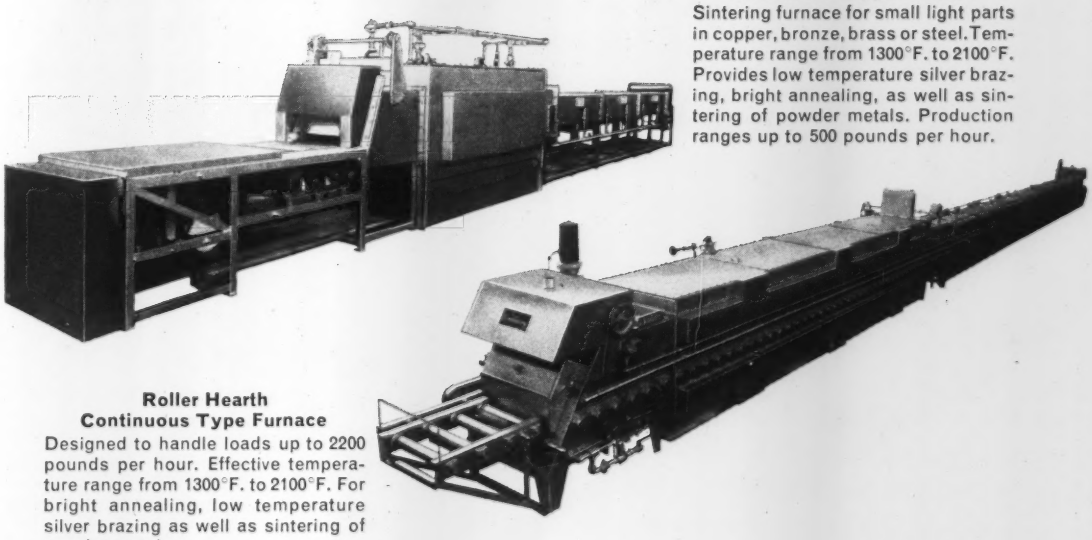
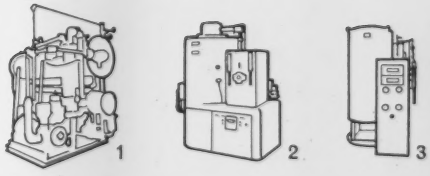


Hand Pusher Batch Type Furnace
For small production lots and experimental sintering. An all-purpose unit for operation from 1300°F. to 2500°F. Made in various sizes for sintering from 25 to 300 pounds per hour.

Mesh Belt Continuous Type Furnace
Sintering furnace for small light parts in copper, bronze, brass or steel. Temperature range from 1300°F. to 2100°F. Provides low temperature silver brazing, bright annealing, as well as sintering of powder metals. Production ranges up to 500 pounds per hour.



Roller Hearth Continuous Type Furnace
Designed to handle loads up to 2200 pounds per hour. Effective temperature range from 1300°F. to 2100°F. For bright annealing, low temperature silver brazing as well as sintering of powder metals.



Lindberg atmosphere generators provide the proper atmospheres recommended for use with Lindberg Sintering Furnaces. These are: 1. HYEX Generator... approximately 4% carbon dioxide—18% hydrogen—12% carbon monoxide and 66% nitrogen. 2. HYEN Generator... neutral atmosphere approximately 21% carbon monoxide—40% hydrogen—38% nitrogen and 1% methane. 3. HYAM Generator... composed of approximately 75% hydrogen and 25% nitrogen.

For sintering furnaces, just as in all types of industrial heating equipment, you can depend on Lindberg's ability to supply exactly the right equipment for your needs. Just get in touch with your nearest Lindberg Field Representative, or write Lindberg Engineering Company, 2441 West Hubbard Street, Chicago 12, Illinois. Los Angeles Plant: 11937 South Regentview Avenue, at Downey, California.

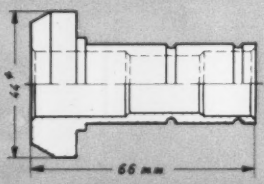
See Lindberg in Booth No. 12, Metal Powder Show in Philadelphia

LINDBERG heat for industry

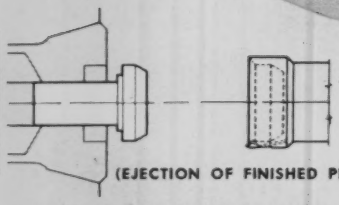
All 'round the world.

HOW ACME-GRIDLEY BASIC DESIGN SAVES TIME IN GERMANY

Automotive sleeve produced in West Germany on a German-built 6 Spindle Acme-Gridley Automatic. Machining is performed in 27.3 seconds, a saving of 30.8% of the time used by previous methods.



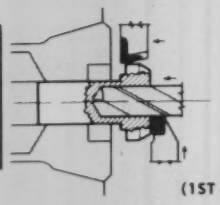
6TH POSITION



(EJECTION OF FINISHED PIECE)

MAGAZINE LOAD (1ST OPERATION)

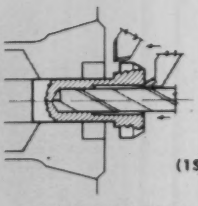
1ST POSITION



(1ST OPERATION)

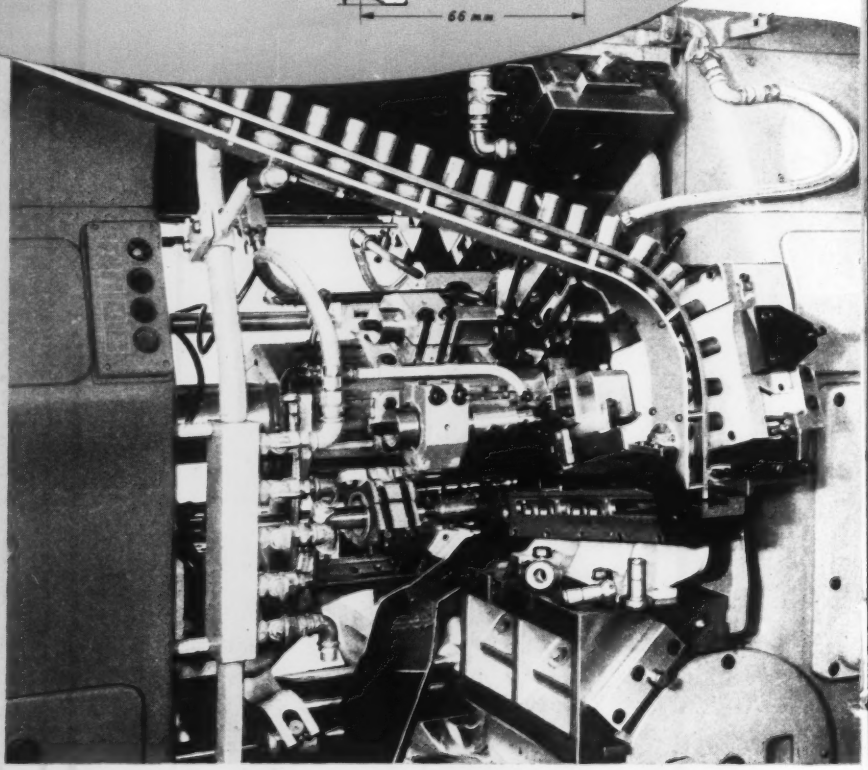
ROUGH TURN HEAD
FACE
DRILL LARGE HOLE

2ND POSITION



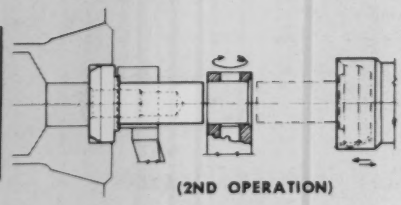
(1ST OPERATION)

FINISH TURN HEAD
CHAMFER INNER DIAMETER
DRILL SMALL HOLE



RÜCKANSICHT MIT MAGAZIN EINRICHTUNG
REAR VIEW WITH MAGAZINE LOADING ATTACHMENT

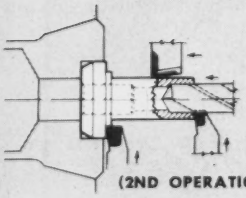
3RD POSITION



(2ND OPERATION)

TURN OVER AND RELOAD

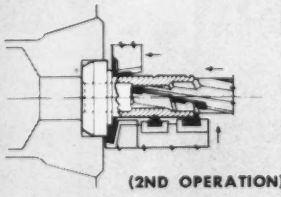
4TH POSITION



(2ND OPERATION)

TURN SHANK DIAMETER PARTWAY
FACE BACK OF HEAD
FACE END OF SHANK • DRILL

5TH POSITION



(2ND OPERATION)

TURN SHANK DIAMETER REMAINDER • FINISH FORM COLLAR BACK OF HEAD AND GROOVES • FINISH DRILL TWO DIAMETERS WITH STEP DRILL

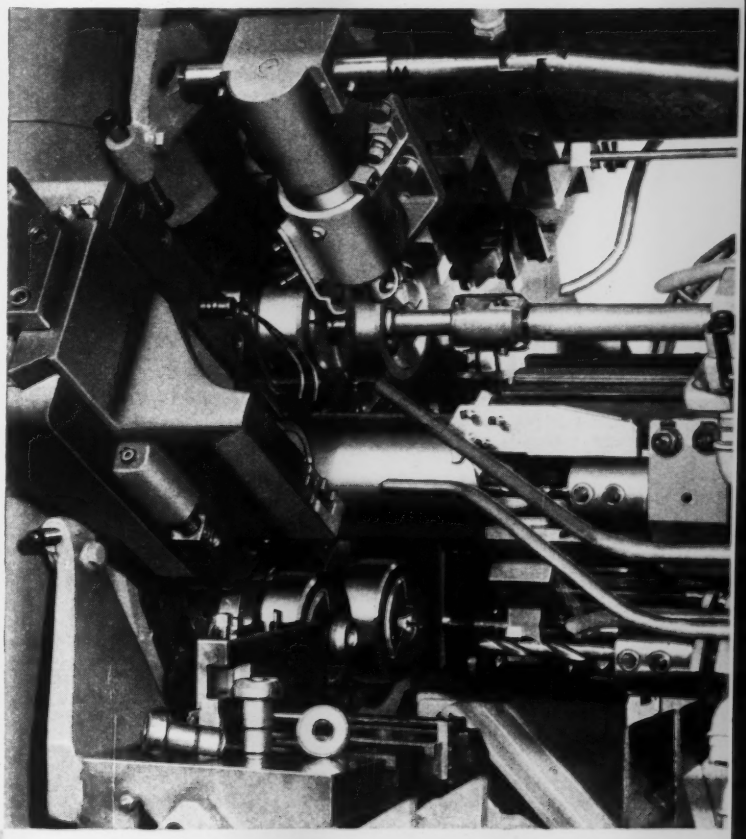
. . . where there's work to be done and time to be saved . . .

there's an Acme-Gridley to do it!

In the metal working plants of Essen and Hamburg you'll often hear the phrase *Schnellste Automatiche Fertigung*. Chances are, *mit Acme-Gridleys*, is added for *Schnellste Automatiche Fertigung* means high speed automatic production and all 'round the world the use of Acme-Gridley Automatics results in high speed production ***and*** greater precision in metal working.

The illustrations show the production of an automotive sleeve which is tooled from an upset forged blank fed into the German built Acme-Gridley by a magazine loading attachment. After one end of the part is machined it is turned end-for-end by a special attachment and then the other end machined—the part completely finished.

This high speed—high quality production is typical of the way Acme-Gridley circumferential automation makes things faster—better—cheaper—all 'round the world. That's why we say "When there's work to be done and time to be saved, there's an Acme-Gridley to do it".



WENDE EINRICHTUNG LAGE 3
TURNING ATTACHMENT POSITION 3

why don't you
INDEX . . . to lower machining costs . . . with *Acme-Gridley*
CIRCUMFERENTIAL AUTOMATION

National Acme

THE NATIONAL ACME CO.
189 EAST 131ST STREET
CLEVELAND 8, OHIO
Sales Offices . . . Newark, N. J. . . . Detroit, Mich. . . . Chicago, Ill.

Norton Pulpstones Prove...REPUBLIC COLD DRAWN BARS SHRUG OFF BRUTAL PUNISHMENT

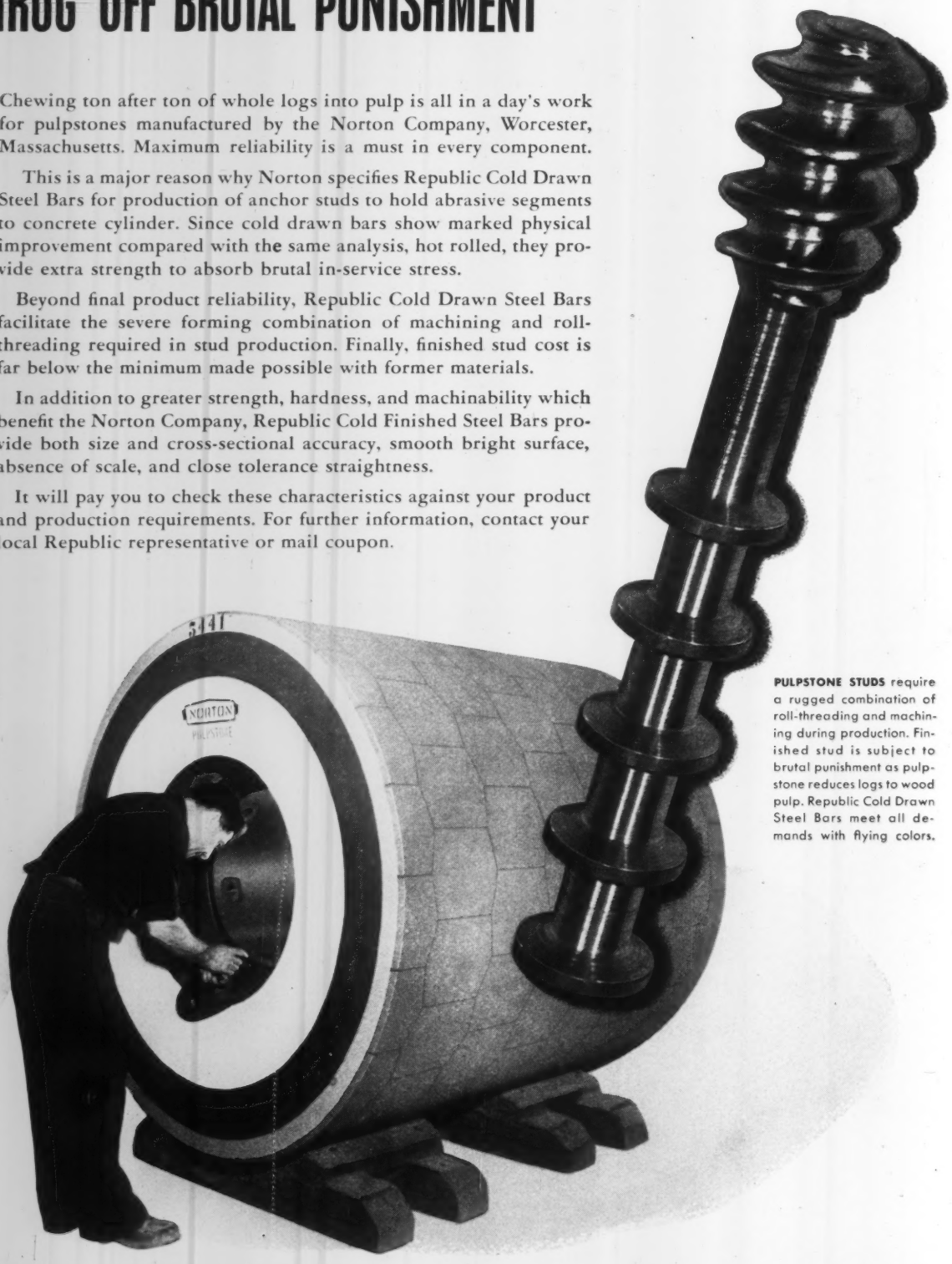
Chewing ton after ton of whole logs into pulp is all in a day's work for pulpstones manufactured by the Norton Company, Worcester, Massachusetts. Maximum reliability is a must in every component.

This is a major reason why Norton specifies Republic Cold Drawn Steel Bars for production of anchor studs to hold abrasive segments to concrete cylinder. Since cold drawn bars show marked physical improvement compared with the same analysis, hot rolled, they provide extra strength to absorb brutal in-service stress.

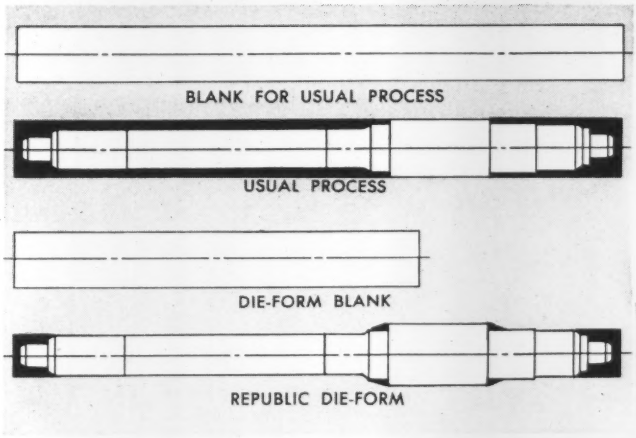
Beyond final product reliability, Republic Cold Drawn Steel Bars facilitate the severe forming combination of machining and roll-threading required in stud production. Finally, finished stud cost is far below the minimum made possible with former materials.

In addition to greater strength, hardness, and machinability which benefit the Norton Company, Republic Cold Finished Steel Bars provide both size and cross-sectional accuracy, smooth bright surface, absence of scale, and close tolerance straightness.

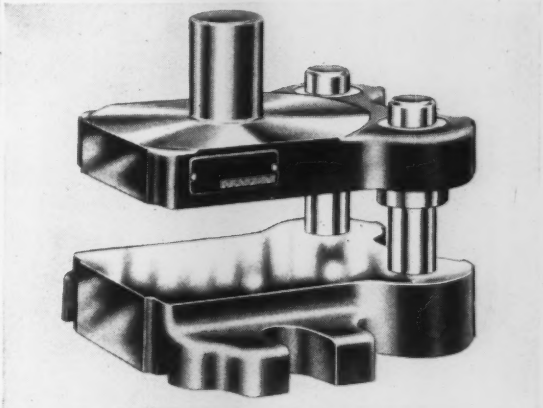
It will pay you to check these characteristics against your product and production requirements. For further information, contact your local Republic representative or mail coupon.



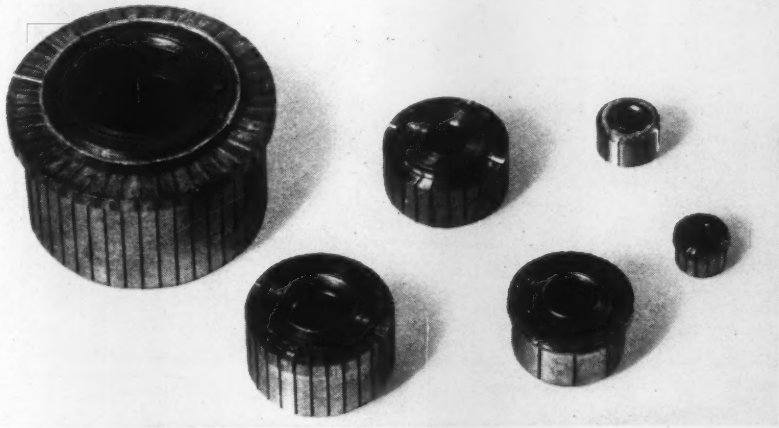
PULPSTONE STUDS require a rugged combination of roll-threading and machining during production. Finished stud is subject to brutal punishment as pulpstone reduces logs to wood pulp. Republic Cold Drawn Steel Bars meet all demands with flying colors.



INCREASED DEMANDS ON MANUFACTURING EFFICIENCY to meet shrinking profit margins require use of modern methods and materials. Republic Die Form is a good example of such progress. Die Form is a cold formed steel bar closely approximating the final multi-diameter part. Using a Die Form blank, you can make major savings in required machining and scrap loss. In the example shown above, 200 tons of Die Form blanks were used to produce parts formerly requiring 300 tons of conventional bar stock. Mail coupon for facts.



METAL STAMPING PRODUCTION DEMANDS require both strength and accurate machining in die sets manufactured by the Union Manufacturing Company, New Britain, Connecticut. As a result, Union has standardized on Chateaugay, Republic's exclusive low phosphorus, copper-free pig iron for maximum strength, flaw-free, easy-to-machine castings. Other superior characteristics of Chateaugay include its exceptional fluidity, even cooling, and fine dense grain structure. For complete information, clip and mail coupon.



CLOSE TOLERANCE DEMANDS require that center holes in these electric motor commutators be virtually perfect to assure a proper press-fit on motor armatures. When ordinary steel was used for hubs, expensive pull broaches used to finish holes lasted for only 25,000 pieces. Several years ago, Han-Kor, Inc., Cleveland, Ohio, switched to Republic Cold Drawn Leaded Alloy Steel for hub manufacture. Since that time, no broaches have required replacement. Top machinability of Republic Cold Drawn Leaded Steels may help you save time and money. Send coupon for data.

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World's Widest Range of Standard Steels and Steel Products

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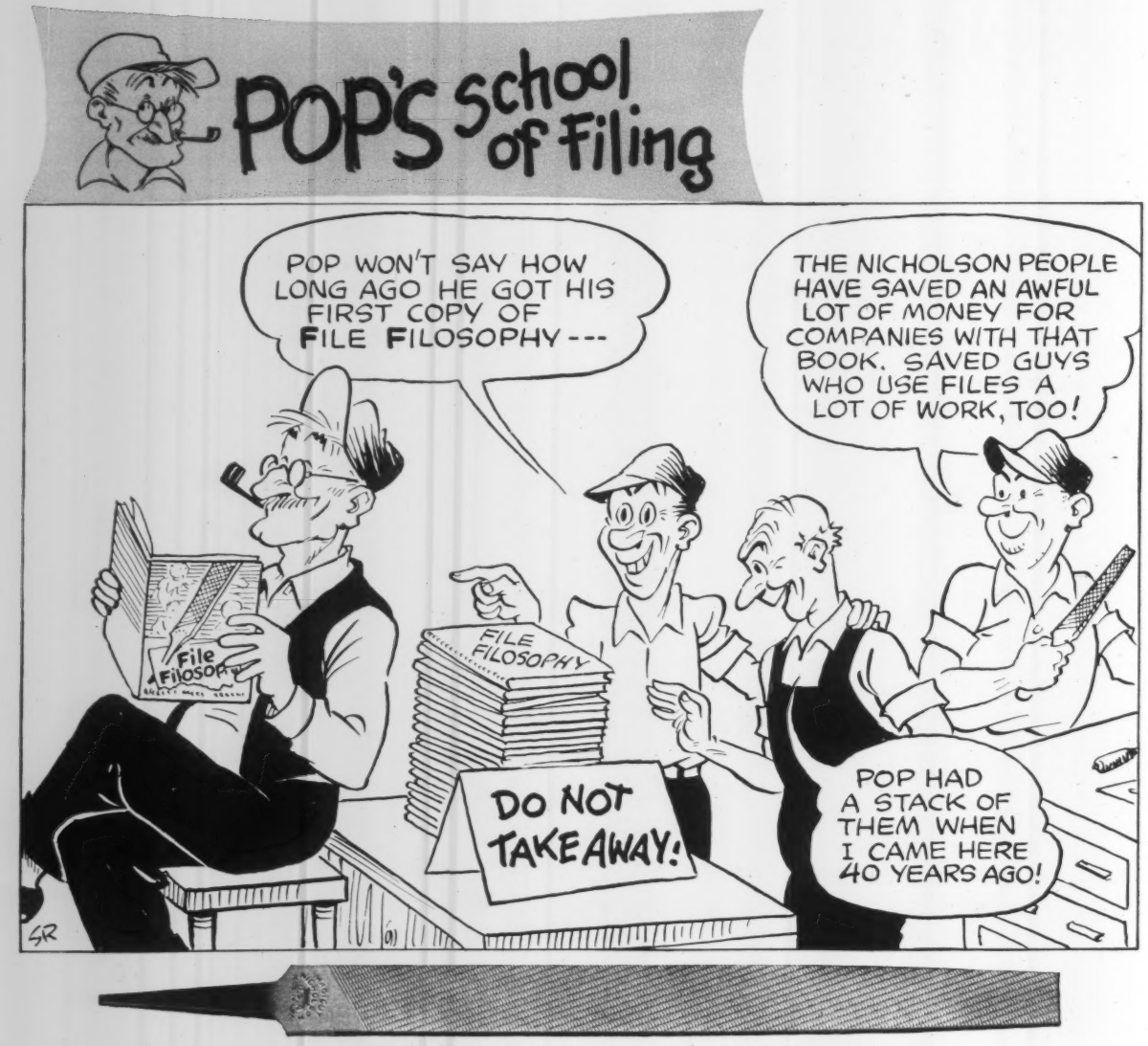
DEPT. ST -5226
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send me more information on:

☐ Cold Finished Steel Bars ☐ Chateaugay Pig Iron
☐ Cold Finished Leaded Steel Bars ☐ Die Form

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____


POP'S school of Filing
POP WON'T SAY HOW LONG AGO HE GOT HIS FIRST COPY OF FILE FILOSOPHY---
THE NICHOLSON PEOPLE HAVE SAVED AN AWFUL LOT OF MONEY FOR COMPANIES WITH THAT BOOK. SAVED GUYS WHO USE FILES A LOT OF WORK, TOO!
File Filosophy
FILE FILOSOPHY
DO NOT TAKE AWAY!
POP HAD A STACK OF THEM WHEN I CAME HERE 40 YEARS AGO!
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We give you the facts and the file for every purpose

Our founder, William T. Nicholson, wasn't happy making the best files ever made back in 1878.

He found out that a lot of users weren't getting out all the work or all the workmanship he put in his files. Trouble was, there was no way to read and learn about filing.

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Founder Nicholson would be pleased at all of this. His company still makes the best files made . . . proudly stamps them "Nicholson" or "Black Diamond." With the help of the book he first wrote nearly 80 years ago, file users like you are getting the kind of results they want. When you want files or filing information, your helpful Industrial Distributor has the best in both.

Write us for a free copy of the *new* "File Filosophy."

Industrial Distributors provide the finest goods and services in the least possible time. Our files are sold exclusively through them.

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(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

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NICHOLSON and BLACK DIAMOND FILES

A FILE FOR EVERY PURPOSE

CALENDAR
OF MEETINGS

Apr. 7-8, Wire Reinforcement Institute Inc.: Annual meeting, Boca Raton Hotel, Boca Raton, Fla. Institute's address: National Press Bldg., Washington 4, D. C. Managing director: Frank B. Brown.

Apr. 8, Material Handling Institute Inc.: Spring membership and directors' meeting, Cleveland Hotel, Cleveland. Institute's address: 1 Gateway Center, Pittsburgh 22, Pa. Managing director: L. West Shea.

Apr. 8-9, Industrial Truck Association: Spring meeting, Hotel Cleveland, Cleveland. Association's address: 526 Washington Loan & Trust Bldg., Washington 4, D. C. Managing director: William Van C. Brandt.

Apr. 8-10, Industrial Fasteners Institute: Annual meeting, Boca Raton Hotel, Boca Raton, Fla. Institute's address: 1517 Terminal Tower, Cleveland 13, Ohio. Secretary: James J. Whitsett.

Apr. 8-11, Society of Automotive Engineers: Aeronautic meeting and production forum and aircraft engineering display, Hotel Commodore, New York. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Apr. 9-10, Malleable Founders' Society: Market development conference, Edgewater Beach Hotel, Chicago. Society's address: 1800 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

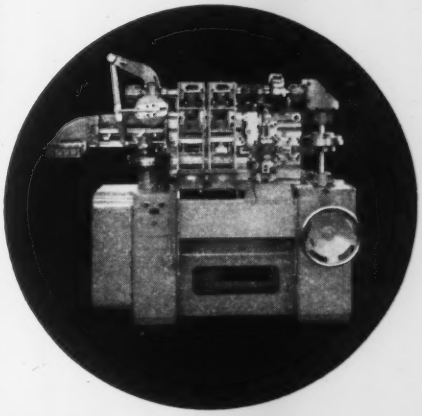
Apr. 13-16, American Chemical Society: Annual meeting, San Francisco. Society's address: 1155 16th St. N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Apr. 14-15, American Society of Mechanical Engineers and American Institute of Plant Engineers: First annual maintenance and plant engineering conference, Penn-Sheraton Hotel, Pittsburgh. Information: ASME, 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

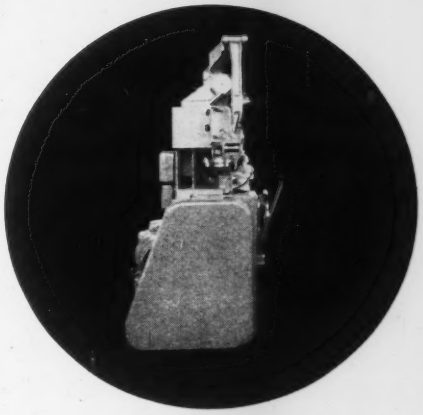
Apr. 14-15, American Zinc Institute Inc.: Annual meeting, Chase Park Plaza Hotel, St. Louis. Institute's address: 60 E. 42nd St., New York 17, N. Y. Executive vice president: J. L. Kimberley.

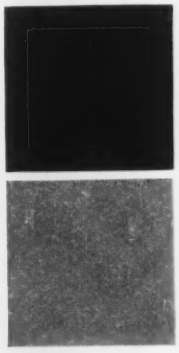
Apr. 14-16, American Management Association: Special west coast general management conference on small business, Ambassador Hotel, Los Angeles. Association's address: 1515 Broadway, New York 36, N. Y. President: Lawrence A. Appley.

Apr. 14-16, American Institute of Mining, Metallurgical & Petroleum Engineers: Open hearth steel and blast furnace, coke oven, and raw materials conference, Statler Hotel, Cleveland. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: Ernest Kirkendall.



VERTICALITY = SETUP TIME / 2





The big story of the important new line of Torrington vertical 4-slides is savings:

Upward of 50 percent savings in setup time, tooling costs and floor space!

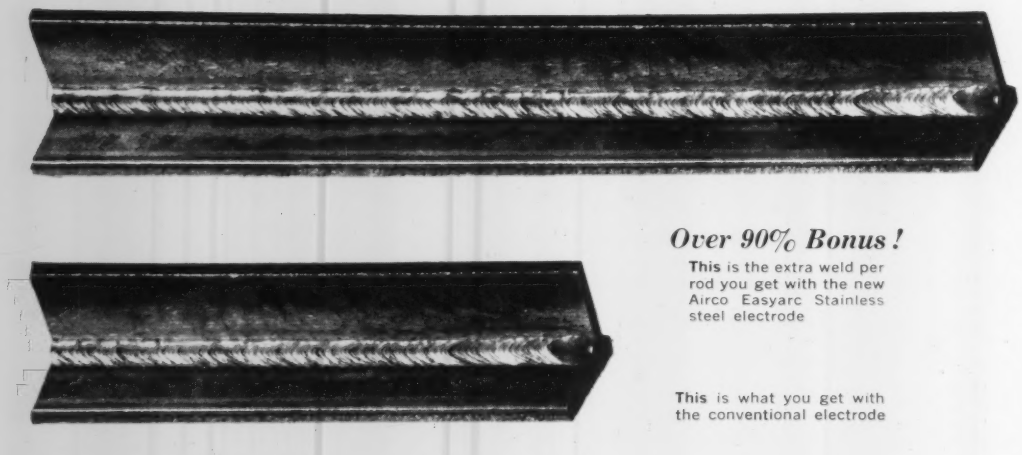
On a strict cost-accounting basis, you cannot afford not to investigate the profitability of replacement with the Torrington "Vertical Line" in the cost-critical field of wire and strip forming production equipment. Full data—or a demonstration—upon request.

THE TORRINGTON MANUFACTURING COMPANY

TORRINGTON, CONNECTICUT • VAN NUYS, CALIFORNIA • OAKVILLE, ONTARIO

Now . . . another dramatic advance in electrodes

from **AIR REDUCTION . . .**



Over 90% Bonus!

This is the extra weld per rod you get with the new Airco Easyarc Stainless steel electrode

This is what you get with the conventional electrode

A NEW LOW-COST ELECTRODE FOR STAINLESS STEEL

New Airco Easyarc stainless steel electrodes produce over 90% more weld per rod . . . actually cost 29% less per pound than conventional stainless steel electrodes!

The new Airco Easyarc stainless steel electrodes are the first powdered-metal electrodes for stainless steel ever offered! They make possible *tremendous savings*, opening up possibilities for stainless use in many *new applications*.

You can weld practically *any* type of stainless steel with the new series. They are available as Easyarc 308, 316, or 347, the designations being equivalent to the type of stainless they weld. Restriking is instantaneous. Available in sizes from 3/32" to 3/16".

Order the new Easyarc stainless steel electrodes from your nearest Authorized Airco Dealer. Look for his name in the classified section of the telephone book under "Welding equipment and supplies." Or call your nearest Airco office.

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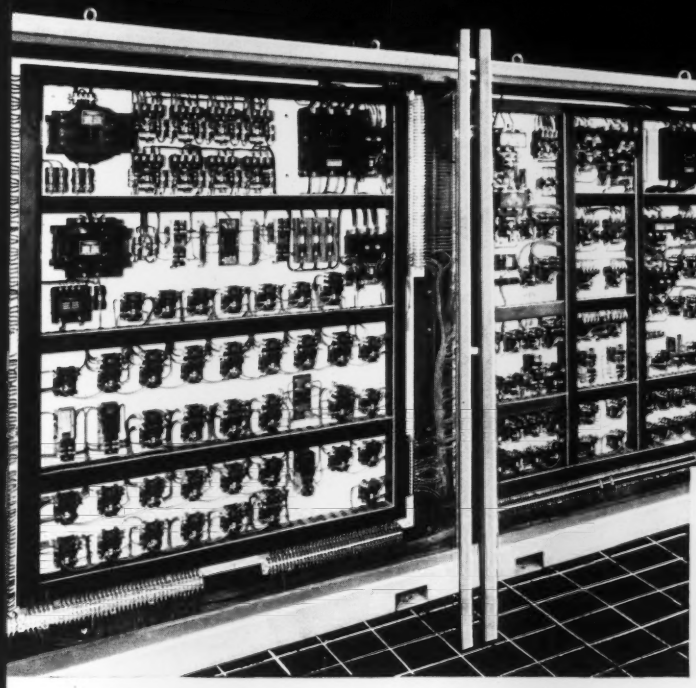
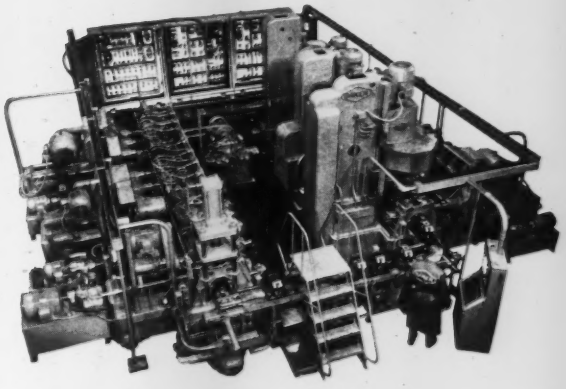


preferred . . . because it is

reliable!

ALLEN-BRADLEY
MOTOR CONTROL
QUALITY



This Baker Automatic Transfer Machine is equipped with a special Allen-Bradley control panel, assembled from standard components listed in the latest A-B Handy Catalog.

Twenty-six machining operations are performed automatically on this huge transfer machine. To keep this machine operating continuously—to avoid costly production shutdowns—Baker Brothers, Inc., selected Allen-Bradley quality motor control—the simple control that is good for millions of trouble free operations.

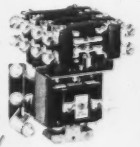
The recognized reliability of Allen-Bradley motor starters and relays is the result of their simple design. Having only *one* moving part, wear and consequent trouble are reduced to the minimum. The double break, silver alloy contacts . . . standard throughout the Allen-Bradley line . . . never need attention. They are always in perfect operating condition.

Simplicity of design and silver alloy contacts are features of all Allen-Bradley control auxiliaries—they are similarly trouble free. Therefore, standardize on the Allen-Bradley line of *quality* motor starters, relays, push buttons, limit switches, and other accessories. You cannot possibly make a mistake!

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

BULLETIN 802T
Oiltight
Limit Switch

Has completely sealed operating head and switch body. This adjustable roller lever type saves installation time.



BULLETIN 700
Solenoid Relay

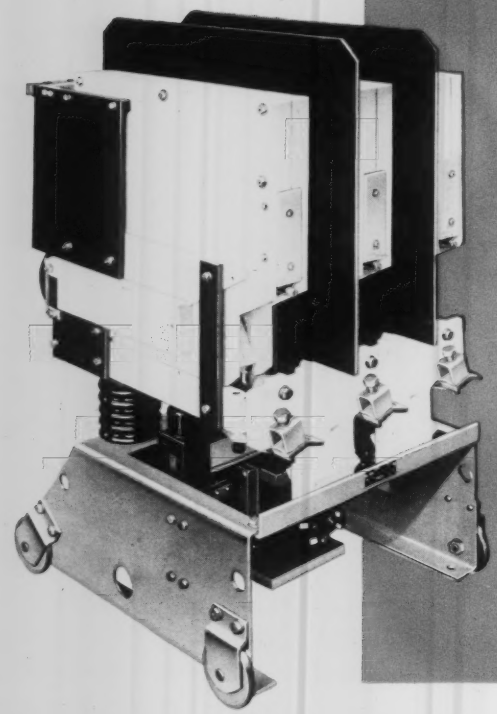
Universal type relay has contacts that can be connected for either "normally open" or "normally closed" operation.

BULLETIN 709
Solenoid
Starter
(Size 1)

Popular across-the-line starter with accurate and reliable overload relays. 8 Sizes to 300 hp, 220 v; 600 hp, 440-550 v.

4-58-R

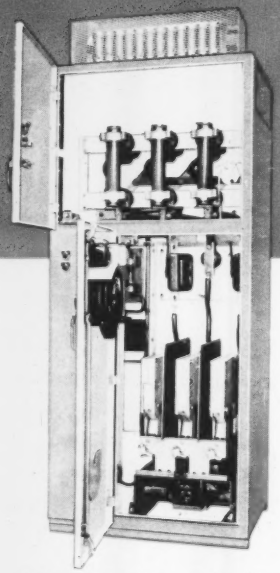
A-B
QUALITY



Air break starters

for high voltage motors

A-B QUALITY

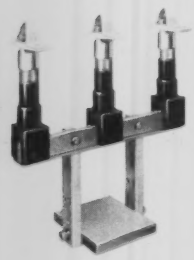


Bulletin 966 high voltage air break, across-the-line synchronous motor starter in NEMA Type 1 enclosure.

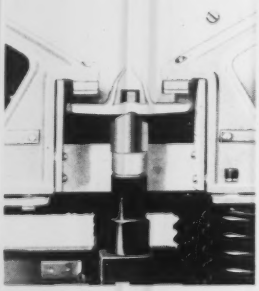
This *new* air break contactor—around which Allen-Bradley has developed a complete line of high voltage starters—is designed to match your *toughest* applications. It features the same solenoid design—with only *one* moving part—that has made Allen-Bradley low voltage starters universally recognized for their tremendous operating life.

These new contactors are available in full voltage and reduced voltage starters—nonreversing or reversing—for squirrel cage, part winding, slip ring, and synchronous motors up to 1500 hp, 2300 volts; 2500 hp, 4600 volts. All starters are equipped with current limiting fuses and have an interrupting capacity of 150,000 kva at 2300 volts and 250,000 kva at 4600 volts.

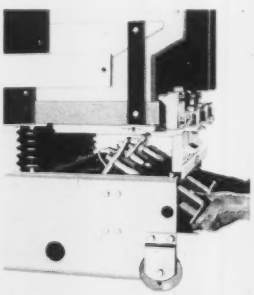
It will pay you to investigate these *quality* starters. Complete information is contained in Publication 6080 . . . please send for your copy, today.



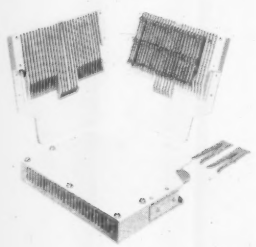
Only One Moving Part. Simple solenoid design eliminates trouble-causing pins, pivots, and flexible jumpers.



Double Break Contacts of silver alloy never need maintenance. Vertical motion assures uniform contact pressures.



Easy Access from Front. Crossbar and contacts removable from front, without special tools, for easy inspection.



Faster Arc Suppression. New blowout design and novel arc chute. Chutes are molded from an arc resistant material.

Allen-Bradley Co.
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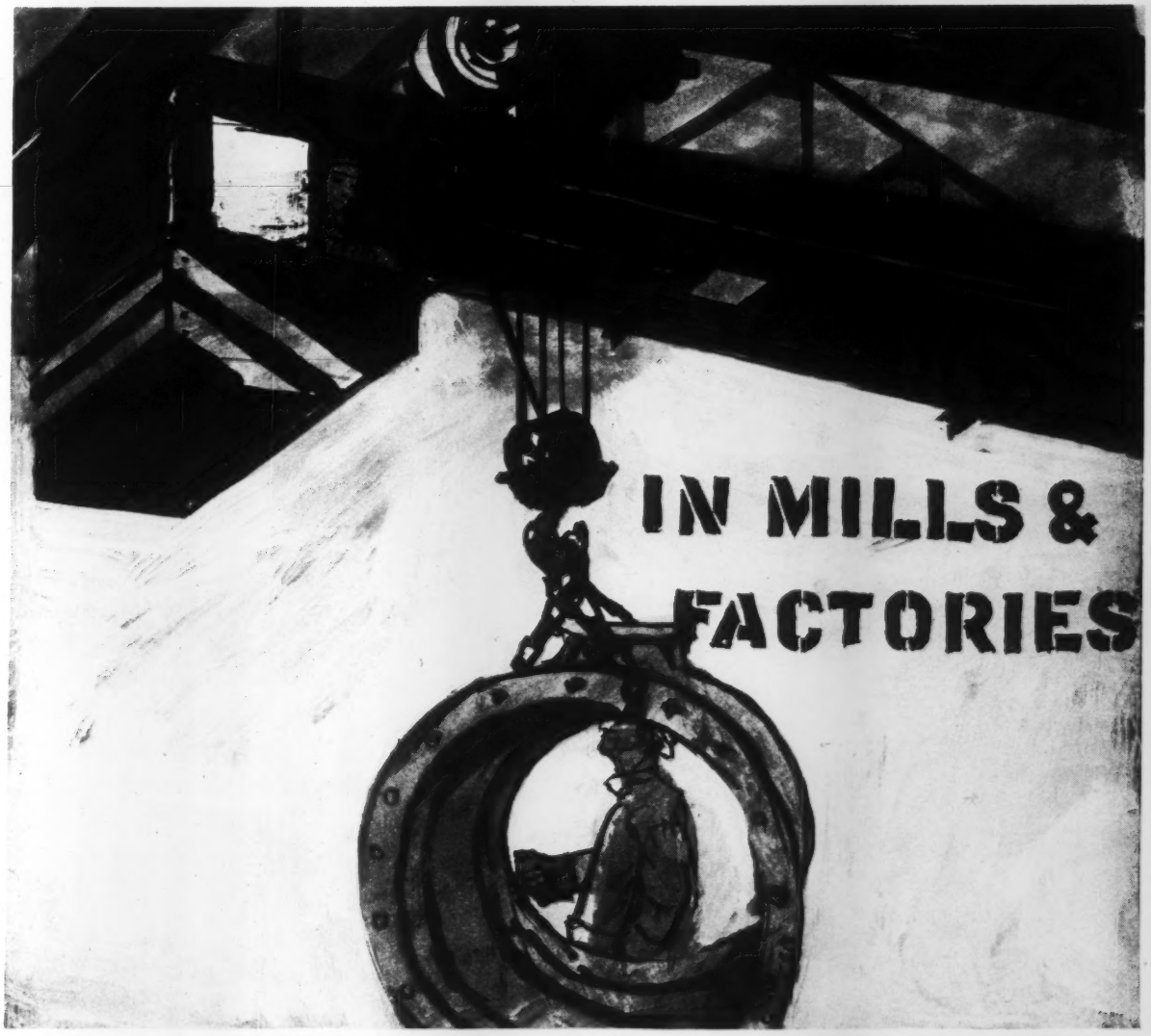
Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd.
Galt, Ontario

ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

4-58-MR

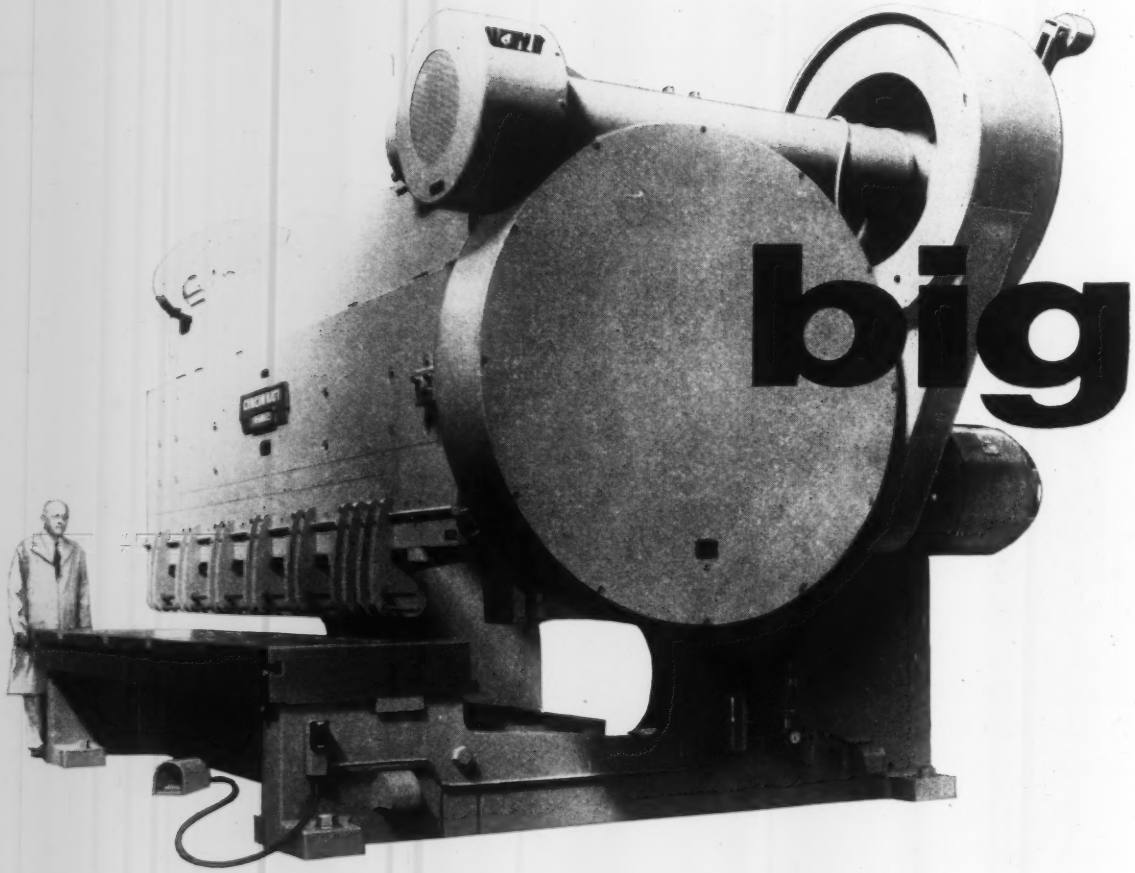


NOTHING **TRANSMITS POWER** WITH THE **TENACITY** OF ROEBLING ROYAL BLUE WIRE ROPE. The other reasons why this wire rope gives long, dependable service are equally outstanding. It has exceptional flexibility, shock and abrasion resistance, and high strength beyond the realm of common wire rope usage. Collectively, these qualities give you a wire rope that is a superior value . . . Roebling Royal Blue. For details of the most widely accepted wire rope in Roebling's history, see your local distributor or write to Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

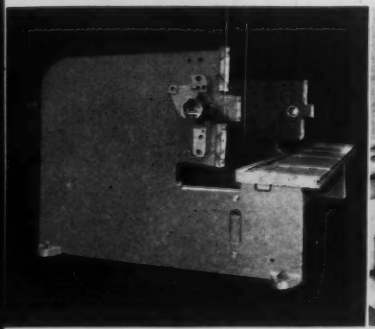
ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

DESIGN
FOR WIRE ROPE
Its ready adaptability is evident wherever power is transmitted. It conforms to unique design requirements. Use wire rope to transmit power.

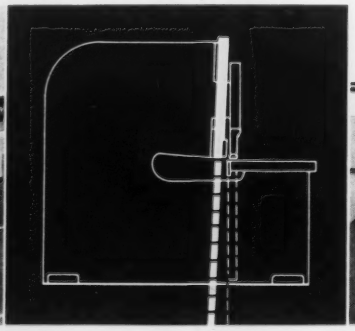


Typical Cincinnati Shears: **big** series 15012, capacity 1½", 12'; **small** series 1004, capacity 3/16", 4'; **in between** series 1810, capacity ¼", 10'.

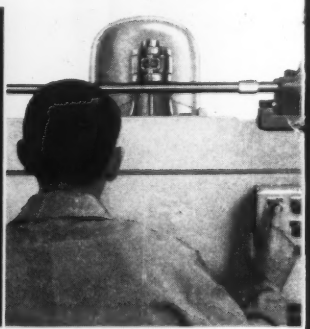


All steel, interlocked construction—no welds used as load supports

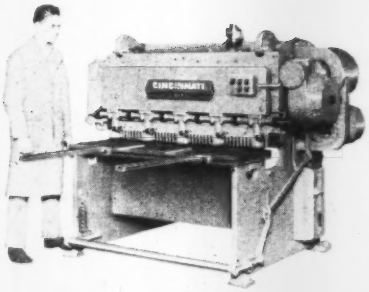
Hydraulic holddowns exert tons of pressure, insure accuracy



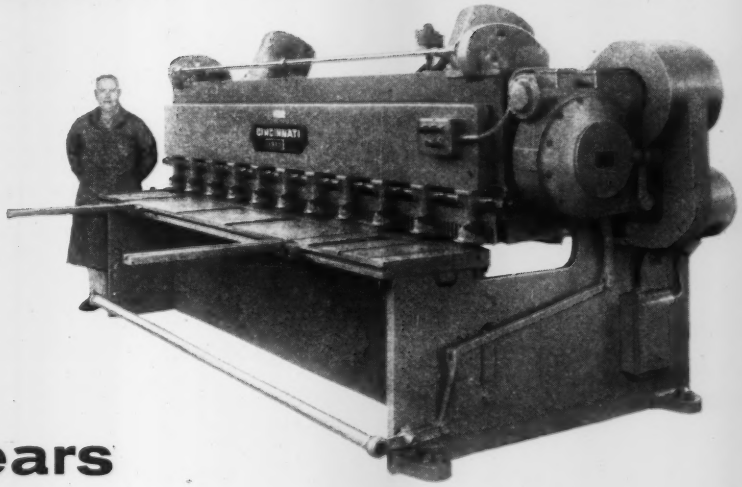
Non-float inclined ram maintains extremely accurate knife clearance



Front controlled power back g is standard, accurate, convenien



small or in between



Cincinnati Shears give you every advantage

Simple operation, micrometer accuracy, cost-cutting speed, all-steel construction, and versatility—these are the advantages which make Cincinnati Shears earn their way in your plant.

And, whether you're shearing steel or plastics, nonferrous metals or asbestos, wire mesh, clad metals, or even radioactive material, the Cincinnati Shear line gives you a range of choices to fit your own requirements. Cincinnati Shears are in service cutting all of these materials.

Cincinnati ruggedness enables you to use one knife clearance for all thicknesses up to machine capacity.

Power operated back gages which are standard equipment, reduce non-productive time. Hydraulic holddowns provide tons of pressure, insure accuracy. The inclined ram permits the economy of four-edge knives, keeps work from binding between back gage and lower knife.

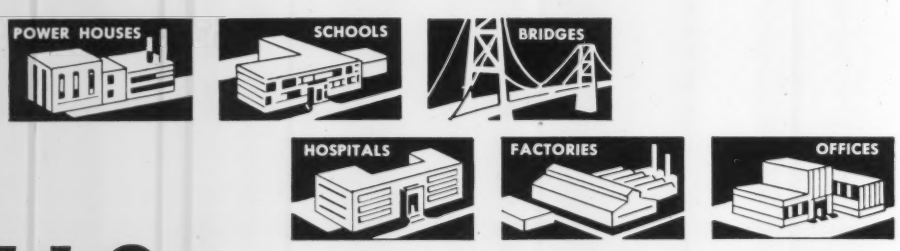
Since gap frames are standard, you can do notching, slitting or shearing work longer than the machine on any Cincinnati Shear to the limit of its gap.

Be sure to get the full Cincinnati story before you buy your next shear. Write Dept. C for Catalog S-7R.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.



INGALLS: Structural Steel Fabricators

Manufacturers Trust Company Building, New York, N.Y.
Henry C. Beck Building, Shreveport, La.
PRUDENTIAL
Federal Reserve Bank of Atlanta, Birmingham, Alabama
Prudential Building, Jacksonville, Florida

STEEL PLATE FABRICATORS ASSOCIATION FOUNDED 1933

AISC AMERICAN INSTITUTE OF STEEL CONSTRUCTION INC. FOUNDED 1921

Modern building design requires that structural members combine great strength and rigidity with ease of erection—at low cost. More and more designers and engineers are specifying fabricated structural steel to meet these important requirements.

Ingalls is a specialist in fabricating structural steel. With facilities to meet every modern requirement for fabricated structural steel, long experience, and a proven record of service, Ingalls stands ready to serve you.

If your company is planning a building which must combine strength, beauty and economy, Ingalls can serve you. Your inquiry is invited.

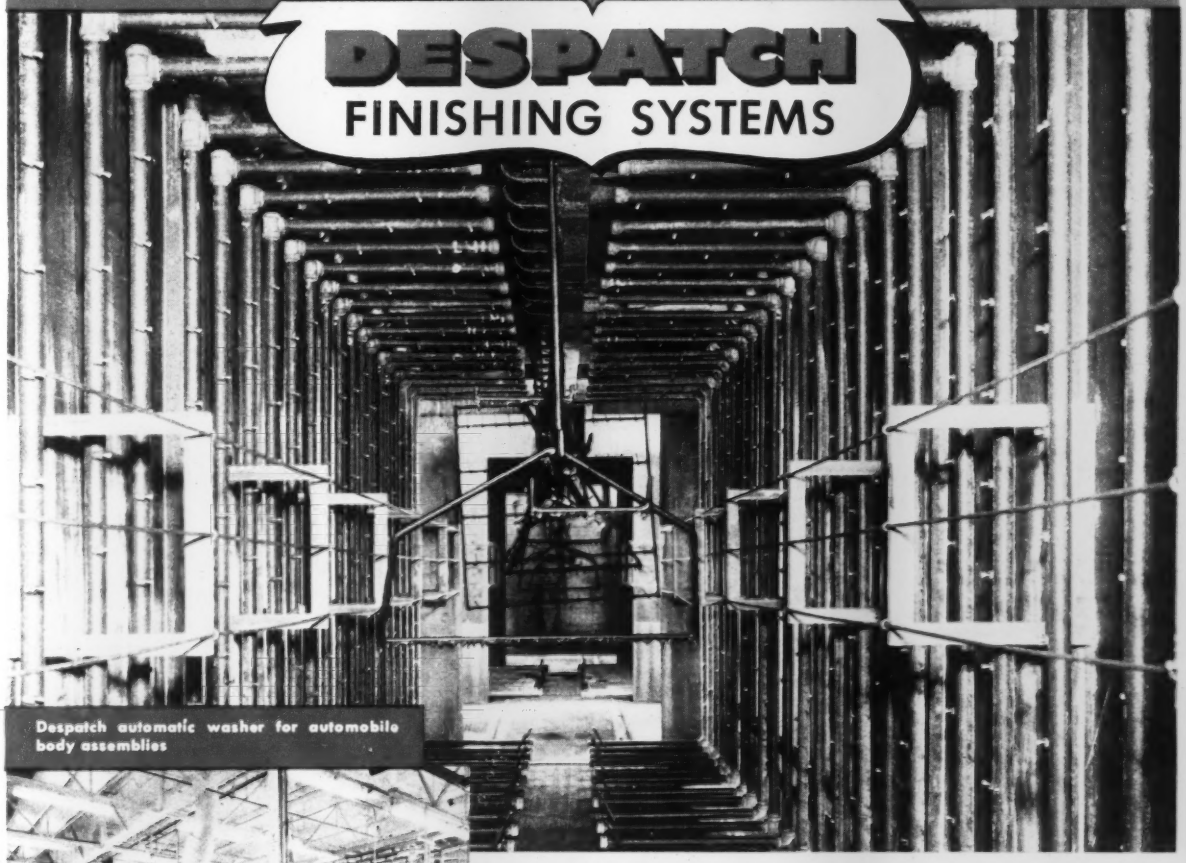
THE
INGALLS
IRON WORKS
COMPANY
Executive Offices
BIRMINGHAM, ALABAMA

INGALLS INDUSTRIES ARE:

The Ingalls Iron Works Company, Sales Offices: New York, Pittsburgh, Chicago, Houston, New Orleans, Atlanta • **The Ingalls Steel Construction Company**, Sales Offices: New York, Chicago, New Orleans, Pittsburgh, Houston, Atlanta • **Birmingham Tank Company**, Sales Offices: New York, Pittsburgh, Chicago, Atlanta, New Orleans, Pascagoula
The Ingalls Shipbuilding Corporation, Shipyards: Pascagoula, Mississippi; Decatur, Alabama Sales Offices: New York, Chicago, Washington, Houston, New Orleans, Atlanta

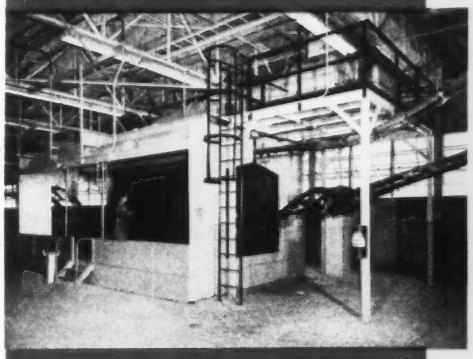
TOOLING UP TO GIVE NEW AUTOMOBILES THEIR SPARKLE

DESPATCH FINISHING SYSTEMS



Despatch automatic washer for automobile body assemblies

Despatch continuous finish baking oven



Despatch water curtain paint spray booth

Designed for high speed high quality finishing

Production at top speed must be coupled with top quality finishing to satisfy the engineers at leading automobile plants. This takes cooperation among paint chemists, automotive engineers and DESPATCH engineers to develop finishing systems of the type shown here—built by DESPATCH for the nation's leading automobile manufacturers.

Are you launching a new product? Do you wish to "pep up" appearance of an existing product? Let DESPATCH'S experience in evaluating, recommending and creating completely engineered finishing systems help solve *your* particular problem. Write today for Bulletin 51K, 16 colorful pages on modern ways to achieve better finishes, faster production and smoother handling of metal products . . . at lower cost.

DESPATCH OVEN COMPANY

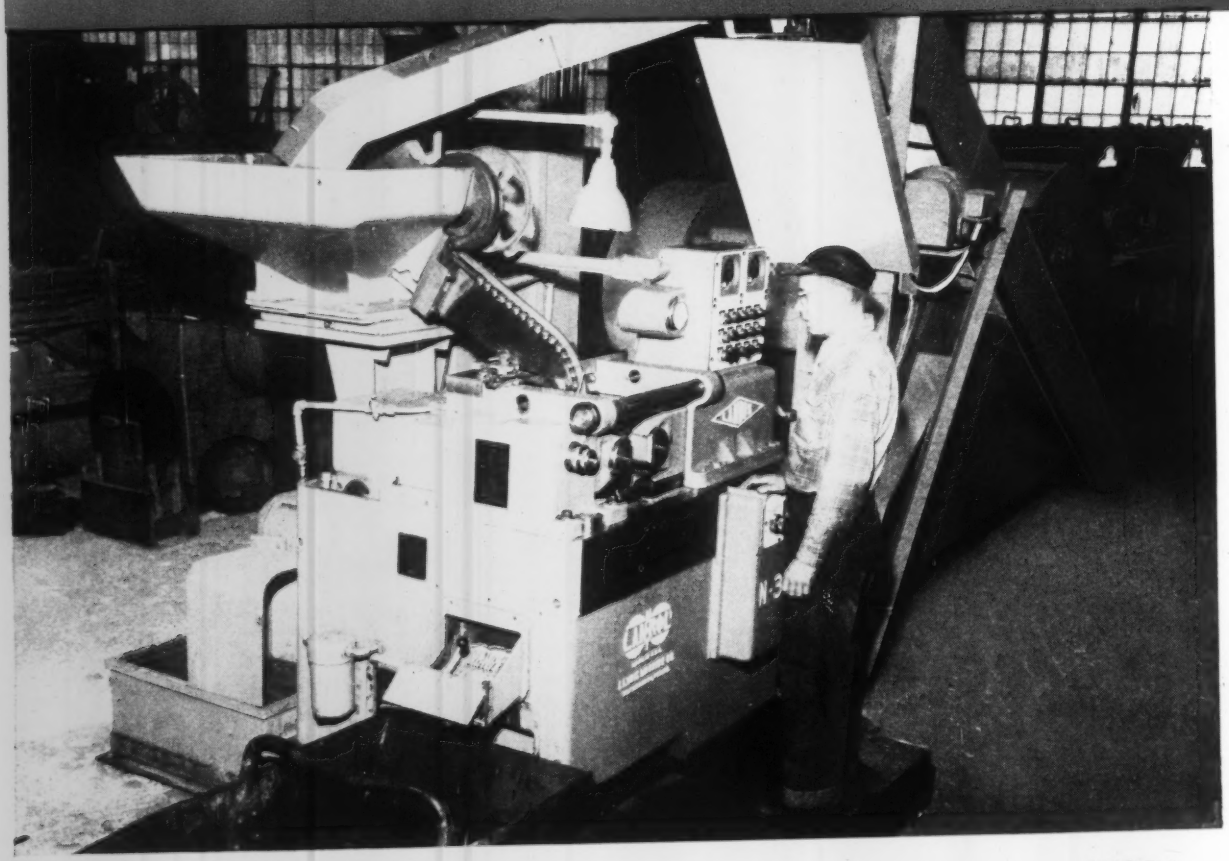
619 S. E. Eighth Street Minneapolis 14, Minn.

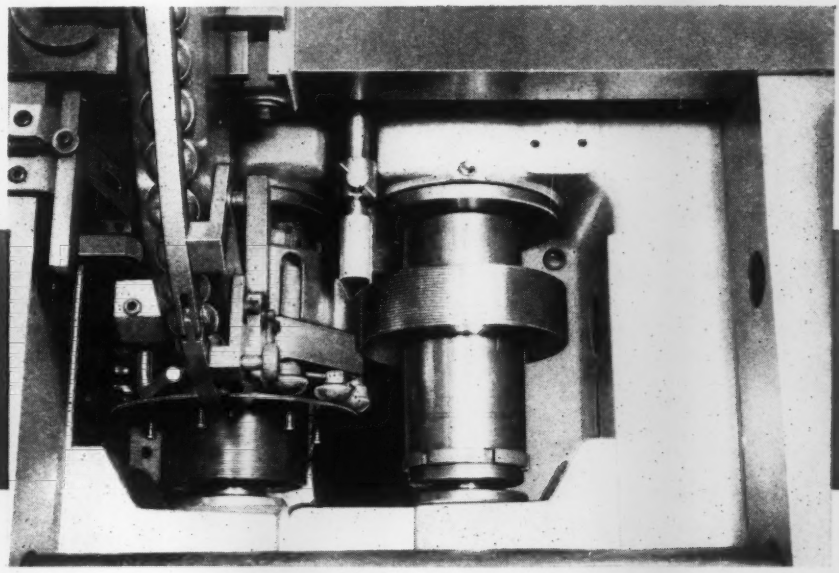
Sales and Service in All 26 Principal Cities

PIONEERS IN ENGINEERING FINISHING SYSTEMS FOR INDUSTRY

AUTOMATED THREAD ROLLING

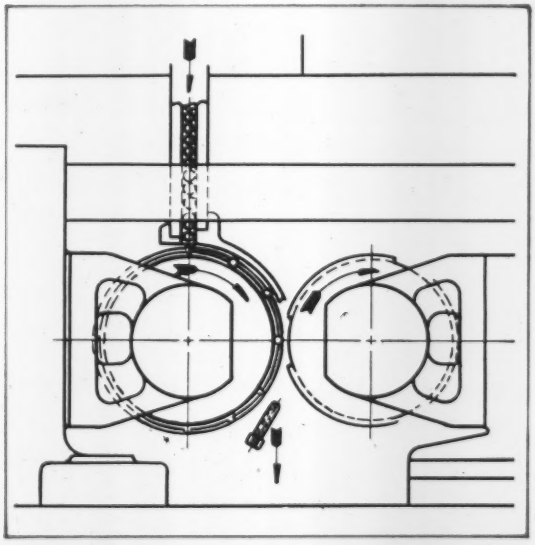
with the LANHYROL machine





The automatic features of the LANHYROL Thread Rolling Machine have enabled a large industrial fastener and related parts company to automate its process for producing button head oval neck track bolts. 3/4" 10 pitch UNC threads are rolled 1 3/4" in length to Class 2A fit.

One man now handles the entire operation, eliminating difficult and costly handling of hot-forged bolt blanks required in the old process. Now . . . bolt blanks are cold-formed from 800-lb. coils of hot-rolled steel wire by passing through a wire-drawer into a two-blow header, conveyed to a hopper, threaded by Continuous Rolling on the LANHYROL Machine, and ejected as finished parts into a bin for removal.



Continuous Rolling (illustrated) is one of three thread-rolling methods utilized by the LANHYROL Machine. Blanks are delivered from a hopper to an automatic, indexing-type workrest. This indexes the pieces according to a preset cycle into and away from the rolling position. There, thread-rolling is accomplished by two opposed cam-type rolling dies.

Although the LANHYROL is capable of rolling 80 track bolts per minute, in this application it is only operated to slightly exceed the production rate of the header which is 60 blanks per minute. Thread finish is considerably improved over previous methods and roll life is excellent . . . more than 3/4 of a million bolts have been threaded to date with the original roll dies.

The LANHYROL Machine produces excellent threads at unequalled rates of output, and its method of operation fits well into automated processes. For information on its unusual range and flexibility, and the Infeed and Thrufeed thread rolling methods, send specifications and ask for Bulletin E-60.

493C

LANDIS *Machine* COMPANY

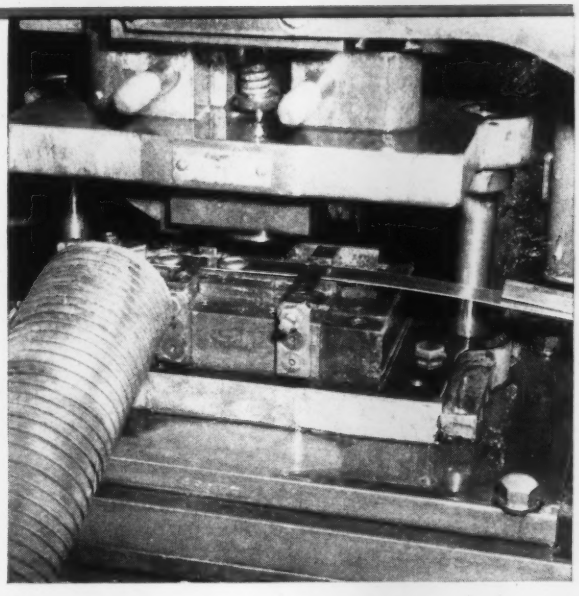
WAYNESBORO • PENNSYLVANIA • U. S. A.

How Frantz Manufacturing Co. improves with these USS products: Amerstrip,

Springs with stamina. These long-lasting American Quality Springs will go into garage doors and other Frantz building specialties. American Quality Springs are available in all sizes, shapes, and descriptions. They are inspected through every stage of the manufacture and meet the highest standards of quality.

roller skates and garage doors

Amerled, and American Quality Springs



AMERSTRIP IS USED in the manufacture of almost every part of the 15 types of Hustler Corporation skates made by Frantz. These skates will stand up under the punishing wear children may give them —yet maintain their attractive finish. Amerstrip is tailored to each particular job . . . has the physical properties to assure a good performance and efficient manufacture.

Tough, durable American Quality Springs play a major part in the smooth operation of Frantz garage doors. These quality springs make garage doors lower in cost and easier to operate than doors using counterweights—and they have proven equally durable.

Amerled ups machining speed 17.4%

Frantz has been machining its own axles and bearing cones for roller skates and conveyor wheels. Recently they switched to Grade "A" free-machining USS Amerled. This easy-to-machine, lead-bearing steel meets all their requirements at lower cost as it permits them to increase machining speed from 320 to 375 S.F.M.—a 17.4% jump—with no loss in tool life . . . and less rejects.

American Steel & Wire produces a complete line of manufacturers wire products. Our large technical staff can tailor these items to fit your individual needs. Call our nearest Sales Office today. American Steel & Wire, General Offices, Rockefeller Building, Cleveland 13, Ohio.

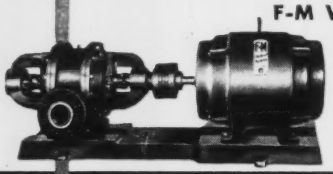
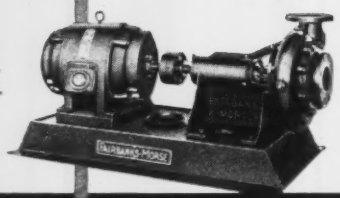
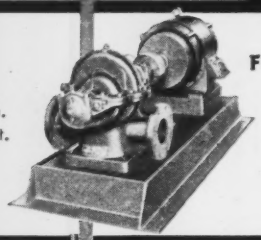
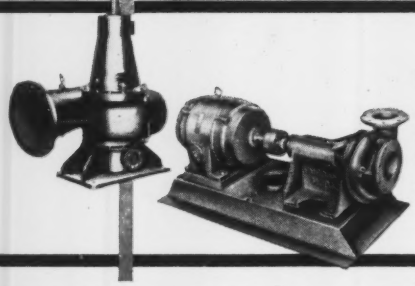
Precision. In the top picture, wheels are being added to roller skates at Frantz's final assemble table. In the bottom picture, a Bliss Roll Feed Punch Press is stamping ball races from 1⅜" .047 USS Amerstrip at the rate of 195 per minute. Frantz also makes heels, toes, and channels from Amerstrip.

USS, American, Amerstrip and Amerled are registered trademarks

American Steel & Wire
Division of USS **United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors • United States Steel Export Company, Distributors Abroad

Guide to better pump selection

for		specify
boiler feed condensate return hot and cold liquids chemicals refrigerants, etc.	up to 200 gpm. pressures to 900 ft.	 **F-M WESTCO PERIPHERAL PUMPS** High pressure at normal operating speeds. Handle widely varying heads with little change in capacity. Sizes 1¼" through 2½".
hot and cold liquids liquid circulation nonviscous liquids boiler feed cooling towers, etc.	up to 900 gpm. pressures to 525 ft.	**F-M BUILTOGETHER CENTRIFUGAL PUMPS** General-purpose, close-coupled pump and motor units mount in any position—horizontal, vertical or angular. Sizes ¾" through 5".
sewage slurries paper stock fruit shrimp vegetables, etc.	up to 30,000 gpm. pressures to 175 ft.	 **F-M NON-CLOG PUMPS** Unexcelled for clog-free handling of liquids with solids in suspension. Sizes 2" through 20". Vertical or horizontal. Bladeless or conventional.
water supply plant service booster circulating air conditioning refrigeration chemical liquids boiler feeds, etc.	up to 50,000 gpm. pressures to 700 ft.	 **F-M SPLIT-CASE CENTRIFUGAL PUMPS** High, sustained efficiency over wide range of conditions. Low-cost maintenance. Sizes 1½" through 36". Single stage or multistage.
hot and cold liquids chemicals circulating liquids nonviscous liquids cooling towers condenser circulation, etc.	up to 100,000 gpm. pressures to 250 ft.	 **F-M END-SUCTION PUMPS** A wide line of rugged, precision-built pumps. Sizes ¾" through 54". Horizontal or vertical centrifugal.

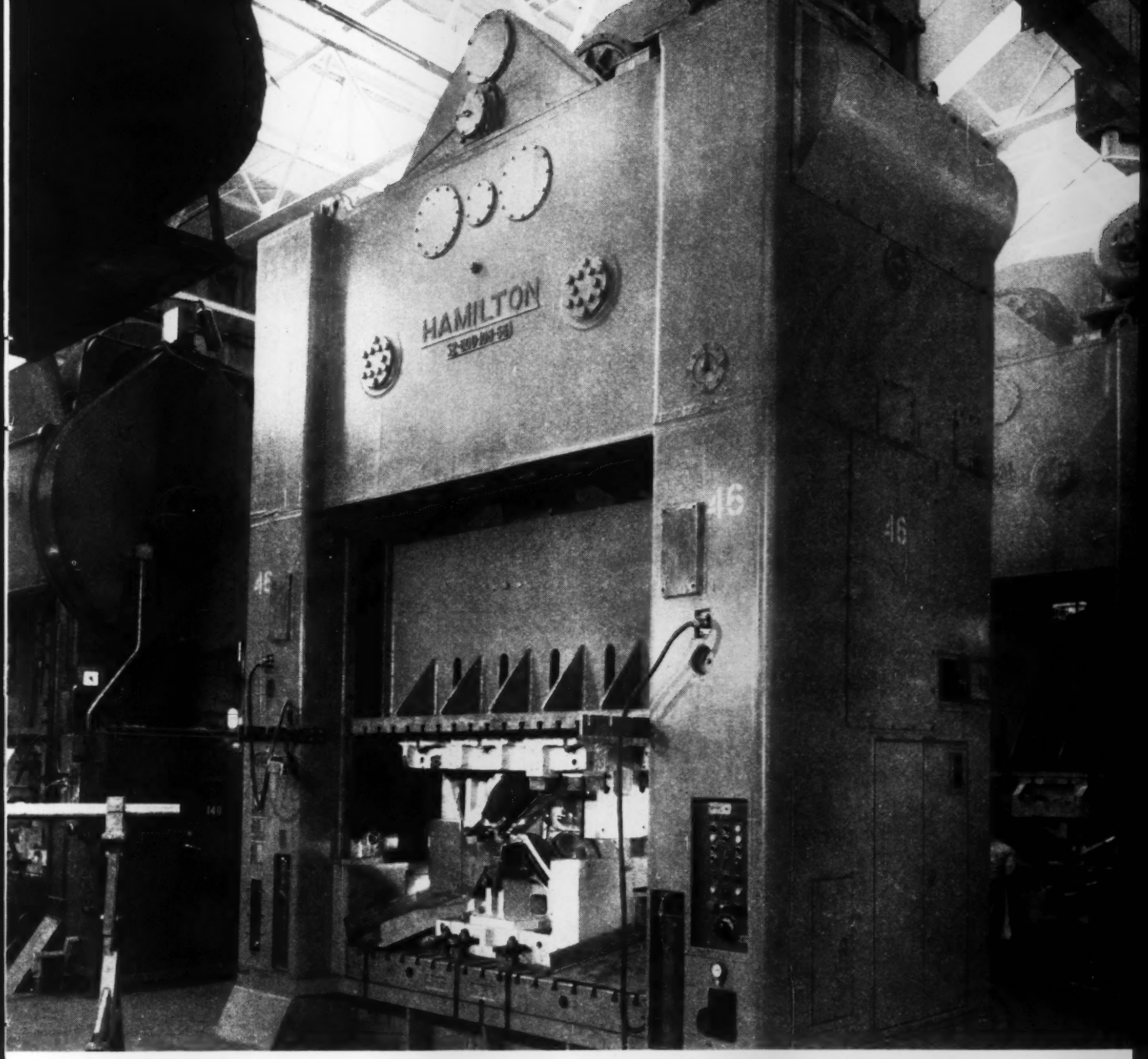
***FOR* LOW-COST PUMPING *SPECIFY* FAIRBANKS-MORSE**

Need new pumps? Your Fairbanks-Morse Dealer has the world's greatest variety for you to choose from. Need help in selection? Your F-M Dealer and F-M Sales Engineer will help specify the right type, right size pump and driver for low-cost, foolproof operation. Call them today, or write Fairbanks, Morse & Co., Dept. S-4-7, 600 So. Michigan Ave., Chicago 5, Illinois.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS



This versatile 600-ton Hamilton Eccentric Gear Press is currently turning out a wide variety of parts in a major automobile plant in Detroit.

Why an eccentric gear press?

Hamilton Eccentric Gear Presses are ideally suited for heavy duty operations—particularly deep draws and other stamping operations where the tonnage is encountered well up on the stroke.

The eccentric and gear are integral and rotate on a short eccentric pin, as a result of which torsional and bending loads are negligible.

The many added features of Hamilton Eccentric Gear Presses guarantee greater production, improved stamping quality, and lower maintenance costs.

Write to Dept. 1C for Bulletin #13301, describing these machines

Hamilton Division Hamilton, Ohio

BALDWIN · LIMA · HAMILTON

Diesel engines • Mechanical and hydraulic presses • Can making machinery • Machine tools

BALDWIN BLH LIMA-HAMILTON

COLD HEADING!

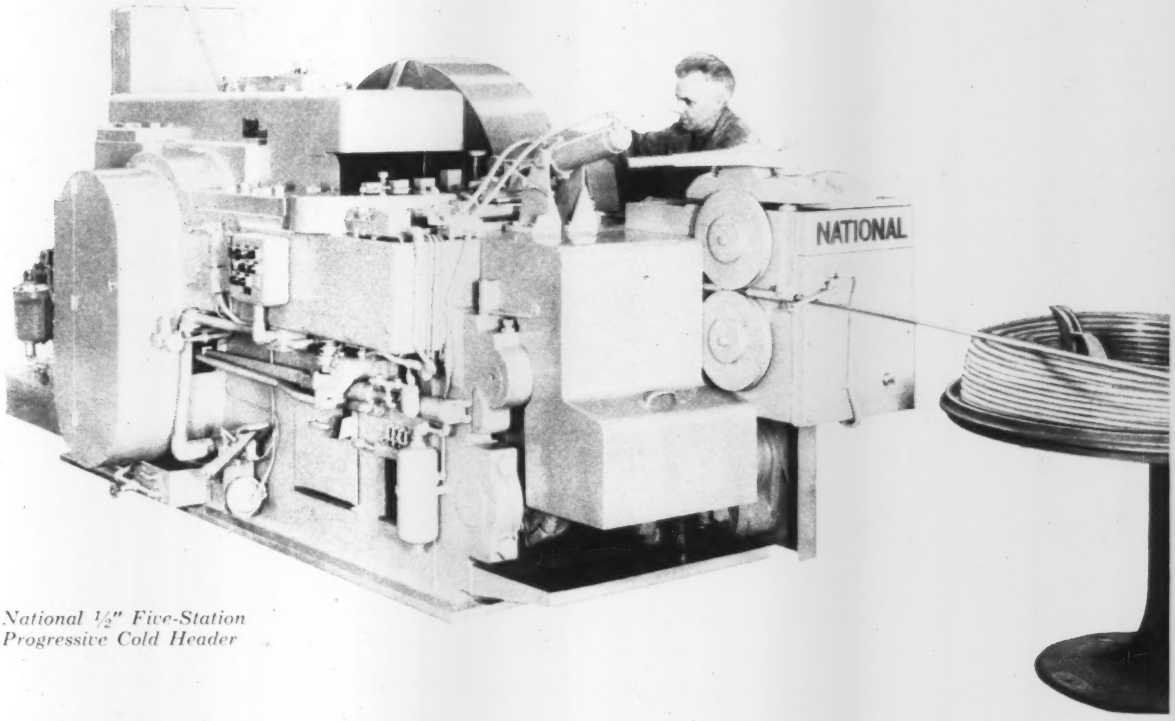
Top row, left to right: piston pin, wheel nut, ball stud, pump shaft, faucet stem.
Middle row: spark plug body, eye bolt, shuttle tip, ball socket, universal joint bearing cup, splined square-head shaft.
Bottom row: tube nut, tappet plunger, hollow rivet, blind rivet, distributor cap insert, commutator bar.

These are typical parts you can make to advantage; not by wasteful cutting, but by *cold heading* — flowing metal into accurate shapes. All of the above jobs, with one exception, were made complete from coiled wire to finished part, without intermediate annealing and coating, *in one compact machine!*

Why are formerly difficult-to-head jobs like these not only possible now, but commercial? The answer is teamwork, on many fronts. For example:

(1) More versatile metals are now available in coiled wire. (2) Die materials and lubricants are still better. (3) We are getting important (to us) but usually insignificant concessions from cold-heading-minded parts designers. (4) National Cold Headers, multiple-die Progressive Headers, Cold Formers

The modern way to make Metal Parts faster, stronger, to amazingly close dimensions!



National ½" Five-Station Progressive Cold Header

and Boltmakers, backed by our fast-growing engineering experience, are now specially equipped to produce reliably the formerly difficult jobs like these shown here.

Are your production problems like these? Perhaps cold heading could pay off for you in a remarkably short time. Let's find out.

Here is our service to metalworking, and you are under no obligation to buy. Send us samples or prints of your jobs. Better yet, bring them to Tiffin where more of our experienced people can participate in *your* problem.

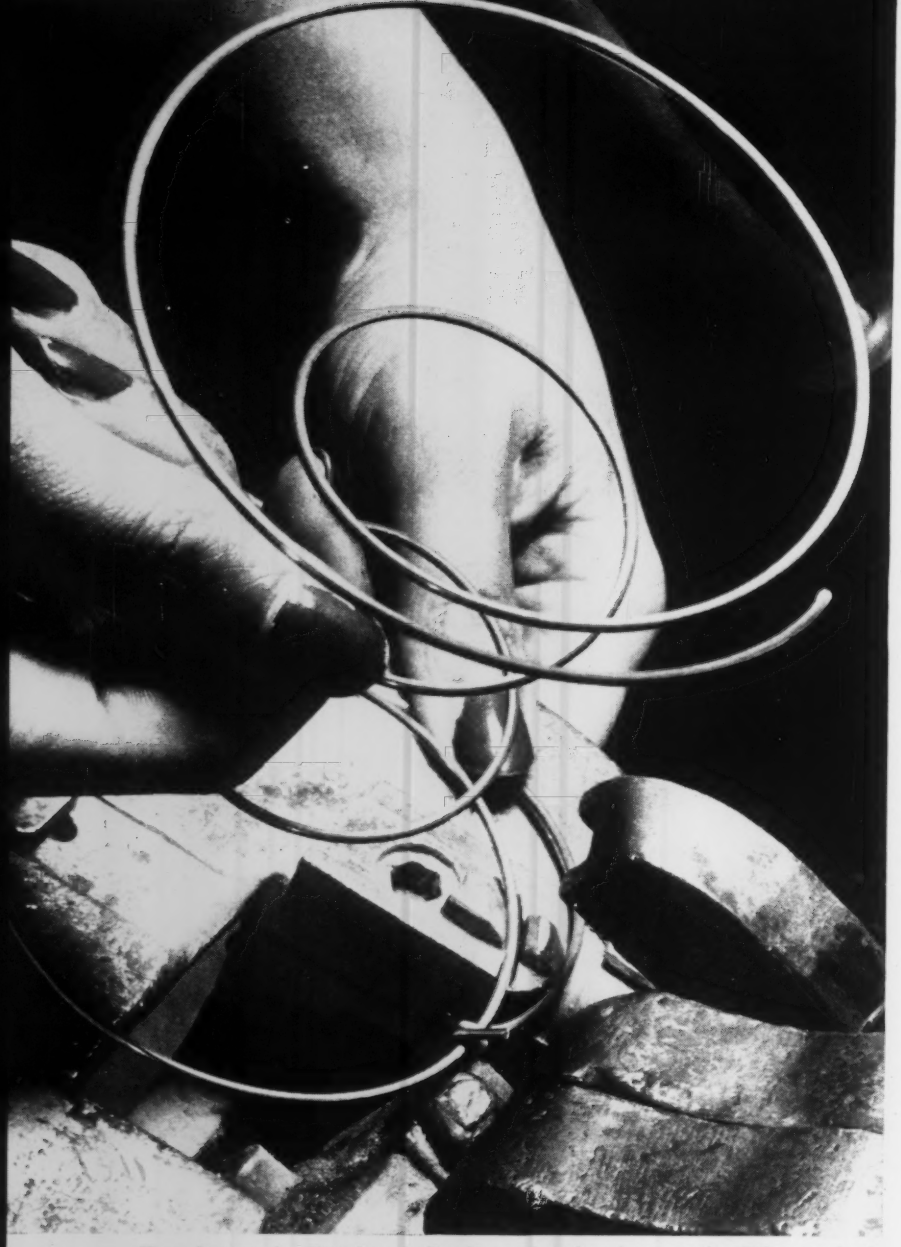
We shall be happy to work with you in developing that better method.

Founded 1874—DESIGNERS and BUILDERS of MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS CO-PIONEERS WITH INDUSTRY OF ADVANCED METALWORKING PRODUCTION METHODS

NATIONAL MACHINERY CO.

TIFFIN, OHIO, U. S. A.

HARTFORD **DETROIT** **CHICAGO**



Tough test for Pittsburgh Steel's upholstery wire at Piedmont Spring Co. comes in coiling and knotting spring. Wire that is too hard will break; wire too soft will lose springiness even after tempering. Uniform quality of Pittsburgh Steel wire insures uninterrupted production.

Pittsburgh Steel wire adds years of life to upholstery springs

Piedmont Spring Company calls Pittsburgh Steel upholstery wire "Best we've ever seen"

Pity the poor upholstery spring . . .

It goes through the most torturous stresses and strains just getting made. Then, fully formed and ready for use, all it can look forward to are years and years of supporting tons of jumping, running, standing, sitting or just-lounging human weight.

If that upholstery spring is unappreciated, then consider how underrated its wire can be. You have to be a veteran upholstery springmaker to know what it takes to make a first rate spring that can outlast the furniture it serves.

Such men are Bill and Bob Gaston of Piedmont Spring Company, Hickory, N.C. They choose only superior quality wire—like that supplied by Pittsburgh Steel Company. During their 31 years of combined springmaking experience, the Gaston brothers have seen just about every twist and turn there is to springmaking. Bill Gaston, who handles purchasing, sums up Pittsburgh Steel upholstery grade wire this way:

"Pittsburgh Steel wire is the best we've seen anywhere. And I'd tell that to anyone. It's exactly what a manufacturer needs in this business. We get uniform quality in every shipment."

Combination of quality Pittsburgh Steel high carbon upholstery wire and precision springmaking gives Piedmont upholstery springs enough liveliness and durability to serve several generations of furniture owners.

Liveliness—a must in an upholstery spring—can be seen when the finished spring is compressed. If it springs back to within one-quarter of an inch of its original length, say nine inches in a frame spring, then it has the quality to take years of hard use.

Upholstery wire from Pittsburgh Steel also must be able to withstand severe deformation during coiling and knotting.

Proper grain structure is another must. Too hard—the wire will break, scrapping an entire coil. Too soft—the wire will coil and knot easily—but it will be lifeless even after tempering. Plant Superintendent Bob Gaston cites another all-important requirement:

(Advertisement)

"The wire we use must have uniform diameter—only .001 variation plus or minus allowed up to .075-inch and .002 variation for .076-inch and larger. If the wire didn't meet our close tolerances, it would seriously damage our coiling machines and stop production. And you know what that does to costs and lost orders. But there's no worry there with Pittsburgh Steel wire."

Piedmont Spring also uses Pittsburgh Steel's border and brace low carbon wire for edgewire frames that hold cushion springs. This wire must be able to withstand crimping and bending and have enough stiffness to support the finished unit. High carbon upholstery grade wire—.047 to .155-inch diameter—is transformed into cushion, back and frame springs. Lacing wire is used to join springs together in cushion and back frames.

Bill Gaston gives much of the credit for his company's enviable spring reputation and low production costs to wire from Pittsburgh Steel. He states flatly:

"We've never had a complaint from a customer because of the quality of the wire. It has never failed to meet our specs."

"And there's another thing I like about Pittsburgh Steel's performance," Bill adds. "That's the service. We keep a low inventory of wire. Many times we run to the bare minimum, but we always get our shipments on time to keep production going.

"When we want to talk to Pittsburgh Steel's district sales office, we get quick attention from the district manager himself right on down.

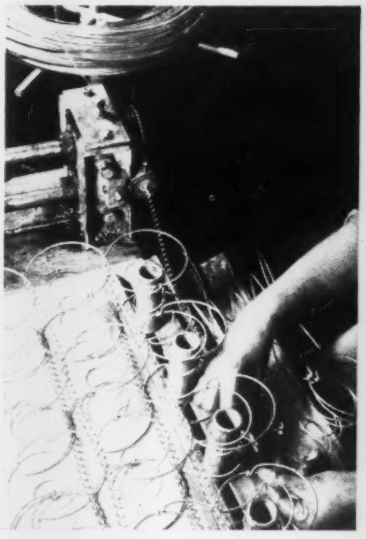
"Our aim at Piedmont is to make only the best upholstery springs—springs that will take years of hard use without failure. And we get them thanks to the most important ingredient in a spring—quality wire like ours from Pittsburgh Steel."

These same benefits from Pittsburgh Steel's upholstery grade wire can be yours, too. And they don't stop with upholstery wire. Oil tempered wire, bright basic, core wire, ACSR wire, rope wire, high carbon MB spring wire or any other kind of manufacturers' wire are available to serve your needs.

Trained Pittsburgh Steel engineers are close at hand to put their knowledge and experience to work in helping solve your problems.

Specify Pittsburgh Steel wire. Call the nearest district sales office listed at right. Do it today.

"Best wire we've ever seen" comments Bob and Bill Gaston (left and center) about high carbon upholstery grade wire from Pittsburgh Steel. The two owners of Piedmont Spring Co. check the life in a Piedmont upholstery spring after tempering. After compression, spring must return to within one-quarter of an inch of original length.



Cushion springs are joined together by lacing wire, forming the shape of a cushion frame for an upholstered chair. Piedmont springs made of Pittsburgh Steel wire take years of hard use.

Baling for shipping, Piedmont upholstery springs are compressed to save space. Bill Gaston says, "We've never had a complaint from a customer because of the quality of the wire."

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

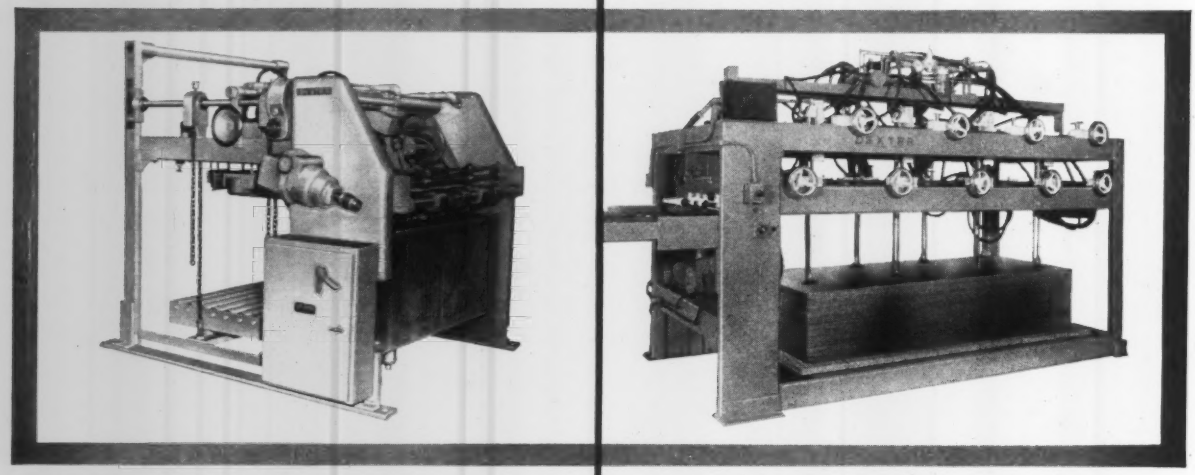
District Sales Offices

Atlanta	Cleveland	Dayton	Los Angeles	Pittsburgh
Chicago	Dallas	Detroit	New York	Tulsa
		Houston	Philadelphia	Warren, Ohio

(Advertisement)

NEED HELP WITH

Sheet Handling Problems?



Dexter 9000# H.D. Feeder runs at speeds up to 9000 sheets of tin plate per hour. Used primarily in most major metal decorating plants.

Dexter Plate Feeder handles metal plates up to 3/16" thick and a maximum size of 4-by-12 feet. Used in many plants for feeding descaling equipment.

CHECK WITH DEXTER

Dexter's been designing and building sheet handling equipment for over 75 years...*sheet feeders* for metal decorating presses, scroll shears, punch presses, coaters, slitters...*pack turnovers* for speeding up two operation processes...*oven strippers* and *pilers*...*cardboard* and *corrugated board feeders* for presses and packaging lines ...*paper feeders* for printing presses, varnishers and folding machines. For almost any sheet feeding problem Dexter has the answer...with its wide range of equipment.

Dexter Feeders are available in over a hundred sizes, speeds and load capacities to suit individual machine or process requirements. Sheet sizes range from 14 x 14" to four by twelve feet...sheet thickness from .006" to 3/16" or more...load capacities from 6,000 to 30,000 pounds ...and speeds from 600 to 9000 per hour!

Thousands of Dexter sheet handling machines are in use today in container plants, electrical equipment factories, appliance manufacturing plants, in tin plating lines, printing and binding companies, and in a wide variety of other industries...speeding up production efficiently and economically.

If you need help with your sheet feeding problems—check with Dexter. Their combination of engineering experience and equipment flexibility may be the solution for increasing your productivity.

Write or call for complete details.

DEXTER
FOLDER COMPANY
DIVISION OF MIEHLE-GOSS-DEXTER, INC.

General Offices: 219 East 44th Street, New York 17, New York

When fabricators need good stainless plate fast, they're apt to ask for Jessop

To be more explicit, fabricators are apt to specify Jessop stainless steel plate for the following very good reasons: First of all, they don't have to wait in line for delivery. Jessop operates a compact, highly adaptable stainless plate department—all under one roof from melting to finishing. Schedules can be adjusted overnight to fill a rush order. And they get *good* plate. Jessop's advanced new chemical control equipment and techniques guarantee that. So if you are a fabricator and need good stainless plate fast, send your next order to Jessop. You'll be glad you did. Write for literature.

JESSOP

STEEL COMPANY, WASHINGTON, PA.

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Jessop Steel International Corp., Chrysler Building, New York, New York
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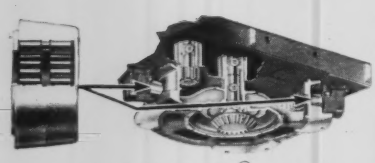
BEARING TIPS by McGill

GUIDEROL® bearings add efficiency – and sealing – to greater capacity

for THEW LORAIN

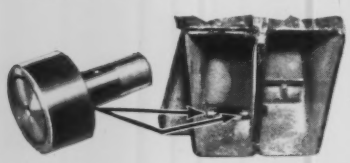


Special GUIDEROL® bearings for turntable rollers

Four of these specially designed turntable rollers support the entire weight of the superstructure plus overhanging work load. They replaced inadequate plain friction rollers to allow for smoother handling of even greater imposed loads with no track wear. Simplified lubrication and longer life reduced maintenance.

Sealed GUIDEROL® bearings for boom peak sheave

The integral seal design of these extra capacity bearings offers exceptional compactness in the Jib and Boom Peak sheaves. Unit costs are lower because counterboring for separate closures are unnecessary. Retained grease in the protected bearings eliminates climbing or lowering the boom for frequent relubrication.



Sealed CAMROL® Cam Followers for outrigger support

Located in the outrigger carrier channels, these cam follower bearings facilitate extending the supporting outriggers. Subject to heavy working loads, these sealed bearings provide low cost and dependable anti-friction support rollers that stay clean and well lubricated.

McGill bearings have the proven quality, design advantages, extra capacity and precision required to insure the efficiency of needle type roller bearings in all modern machinery. They are specified by Thew Lorain to help make the performance of their giant 75 ton Moto-Crane smooth, rugged and reliable under severe operating conditions. Thew Lorain specifies McGILL bearings in all heavy duty equipment for their outstanding dependability with reduced maintenance. McGill bearings will work equally well for you. Write for Catalog No. 52-A.

Sealed GUIDEROL® bearings for fairlead sheave

Fairlead sheaves at the base of the boom on drag lines and back hoes, etc. need bearings protected from contamination. Effective sealing against ever present dirt and grit materially extends bearing life.

Insure performance with McGILL®

MULTIROL® GUIDEROL® CAMROL®
Precision Needle Bearings

McGILL MANUFACTURING COMPANY, INC., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA

FERROALLOYS
of Highest Purity

FERROSILICONS

HIGH-CARBON FERROCHROMES

LOW-CARBON FERROCHROMES

LOW-CARBON FERROCHROME SILICONS

SILICOMANGANESE

OTHER SPECIALTY ALLOYS

Produced in modern electric furnaces at Beverly and Jackson, Ohio, plants, from top quality raw materials, Globe ferroalloys are of highest purity and meet the most exacting requirements.

Shipments are by rail, water, or truck, in lump size or crushed.

A highly competent staff of metallurgical engineers is available for consultation. We welcome your inquiry.

PICKANDS MATHER & CO.

Cleveland 14, Ohio

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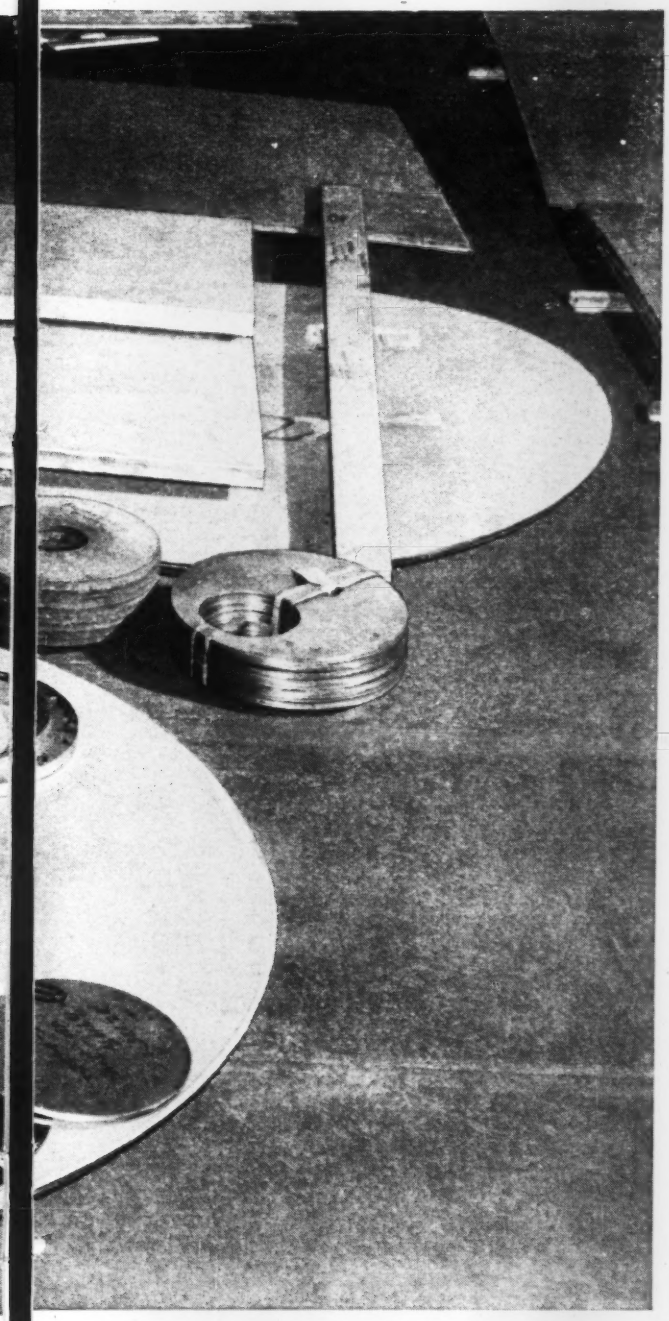
IRON ORE • PIG IRON • COAL • COKE • FERROALLOYS

12"x 2" Disc or 200"x 132"x 2" Plate

...Carlson is your ONE source for ALL stainless steel components

STAINLESS STEEL PLATES • PLATE PRODUCTS • HEADS • RINGS



Check your drawings and you may find that you require all of the stainless steel items shown here—plates, heads, tube sheets, discs, forgings, flanges, rings, special patterns, bars, and sheets (#1 Finish) in the heavier gauges. When you buy all these material components from one source you save time, effort and money.

Your assembly costs are kept to a minimum when you use Carlson's abrasive cut material. Cleaner edges mean less true-up time on the job. There is no heat-affected zone because little heat is developed during the cutting. Fabrication is easier and the finished product is of the highest quality, more dependable in use.

Who pays freight on "offcuts" you can't use? No one, when you use Carlson's service for cutting plate to shape, ready for your fabrication. Plate is sheared, sawed, flame or abrasive cut and machined to your specifications. Eliminating freight charges on excess material lowers your costs.

There's the matter of delivery which also means time and money to you. As specialists in stainless steels, Carlson has the diversified equipment and the technical and practical knowledge to produce the plate or shapes you want, the way you want them with delivery as promised.

Stainless Steels Exclusively

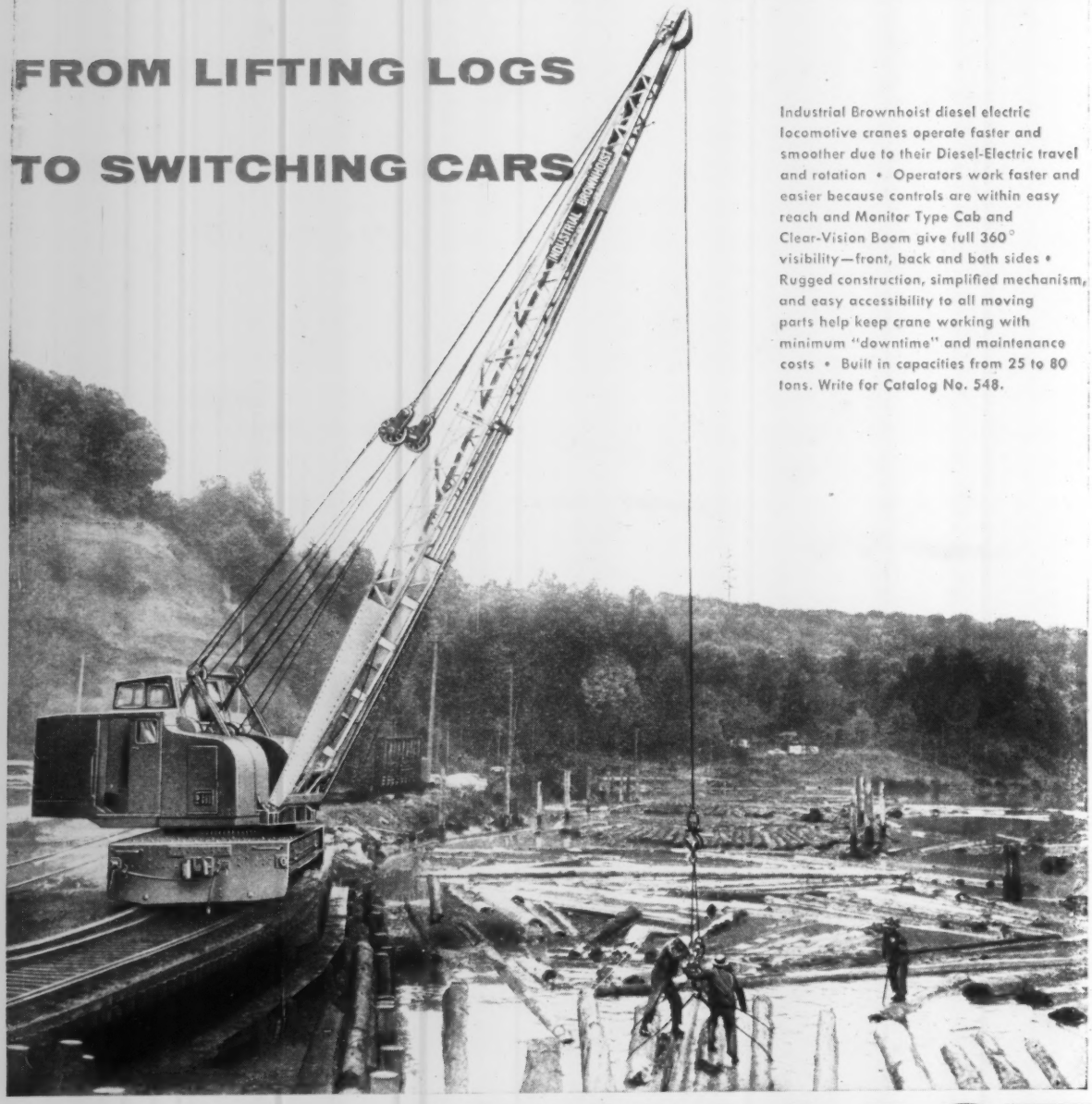
G. O. CARLSON Inc.

THORNDALE, PENNSYLVANIA

District Sales Offices in Principal Cities

DISCS • FORGINGS • FLANGES • BARS AND SHEETS (No. 1 Finish)

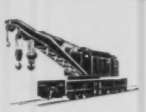
WHY INDUSTRIAL BROWNHOIST LOCOMOTIVE CRANES SPEED UP JOBS FROM LIFTING LOGS TO SWITCHING CARS



Industrial Brownhoist diesel electric locomotive cranes operate faster and smoother due to their Diesel-Electric travel and rotation • Operators work faster and easier because controls are within easy reach and Monitor Type Cab and Clear-Vision Boom give full 360° visibility—front, back and both sides • Rugged construction, simplified mechanism, and easy accessibility to all moving parts help keep crane working with minimum "downtime" and maintenance costs • Built in capacities from 25 to 80 tons. Write for Catalog No. 548.

BROWNHOIST

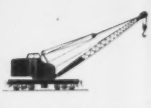
CLAMSHELL BUCKET



250 TON WRECKING CRANE

COAL-ORE BRIDGE

CAR DUMPER



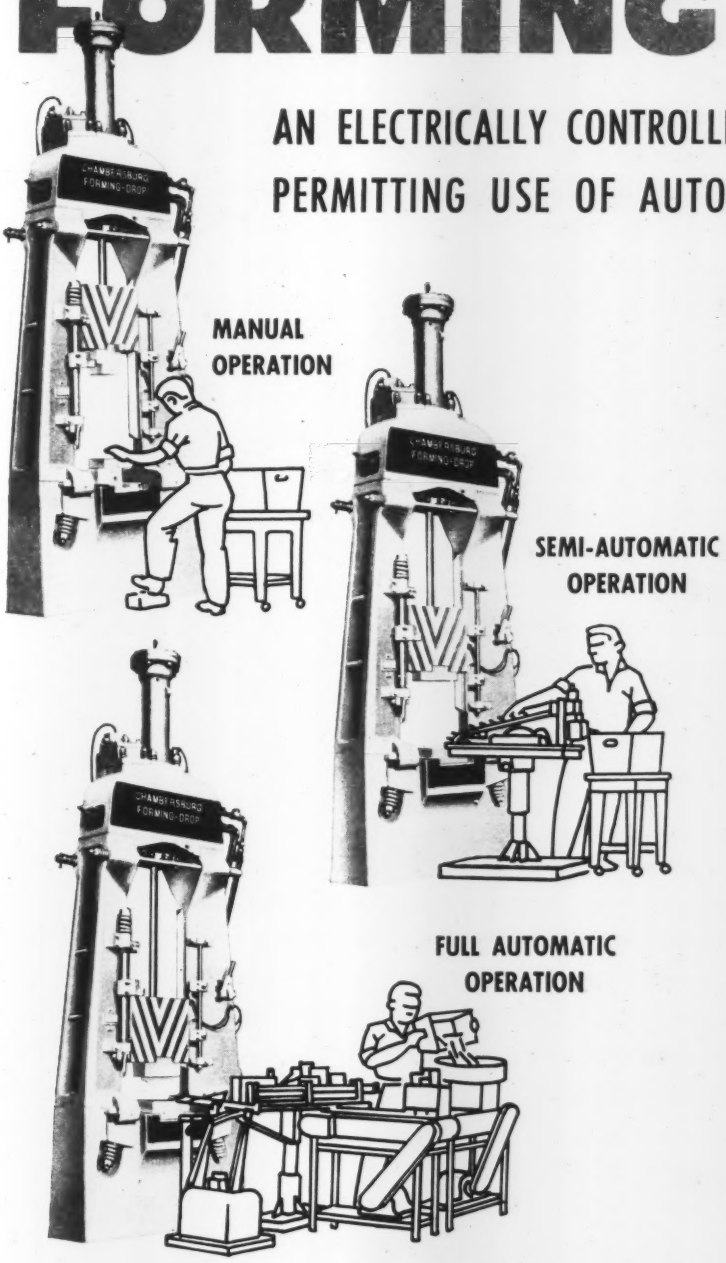
LOCOMOTIVE CRANE

INDUSTRIAL BROWNHOIST CORPORATION, BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago, San Francisco, Montreal, Canada • AGENCIES: Detroit, Birmingham, Houston

199

CHAMBERSBURG'S NEW FORMING DROP

AN ELECTRICALLY CONTROLLED GRAVITY DROP HAMMER PERMITTING USE OF AUTOMATIC FEEDING DEVICES–



THIS NEW HAMMER, the result of original research and development by the Chambersburg Engineering Company, is especially designed for precision blow control and the accommodation of automatic feeding devices to perform such operations as forming, embossing, coining and re-striking in a single die impression.

Precise blow control is achieved by maintaining close pressure tolerances on the air supply and by the fine adjustment of a regulating valve on the hammer's exhaust system. These two features combined in a Chambersburg-designed hammer structure result in a tool which offers faster, safer, effortless and more accurate production in operations requiring a single blow in a single die impression.

The Forming Drop may be arranged for manual stock handling with a standard treadle operation or mechanical feeds can be engineered and installed to suit a variety of jobs. Utilizing suitable hoppers, sorting and orienting equipment in combination with and synchronized to the hammer, many jobs can be completely mechanized.

Consult with Chambersburg engineers regarding the application of the Forming Drop and automatic feed to your job—or write for Bulletin 73-L-7.

CHAMBERSBURG

THE HAMMER BUILDERS

CHAMBERSBURG ENGINEERING CO.

Builders of THE IMPACTER
"FORGING IN MID-AIR"

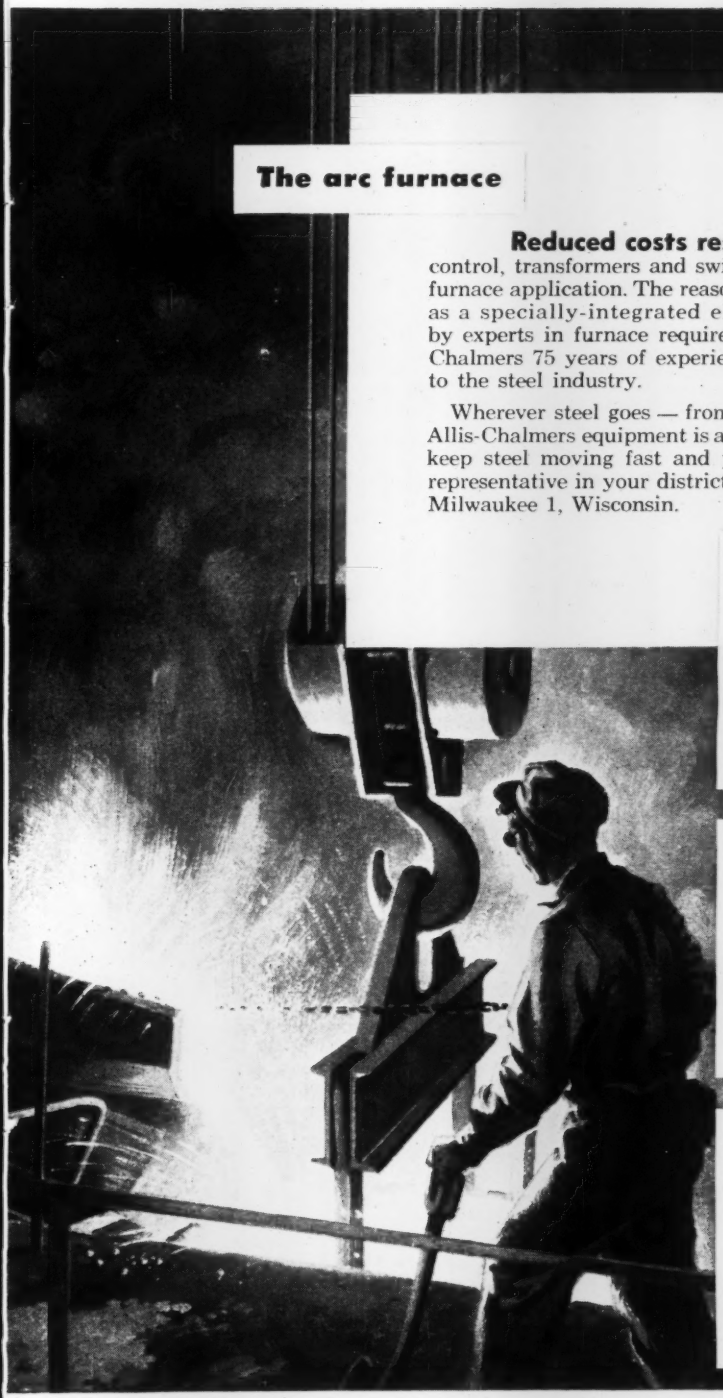
CHAMBERSBURG, PENNSYLVANIA

ALLIS-CHALMERS.

Products for steel: motors, m-g sets, control, pumps, *Texrope* drive equipment, crushers, mills, screens, rectifiers, transformers, substations, switchgear, circuit breakers, turbine-generators, voltage regulators, blowers, compressors, synchronous condensers, and water conditioning equipment.

ALLIS-

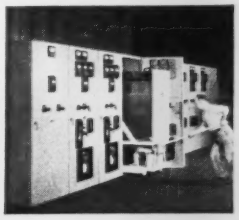
. in Step with STEEL



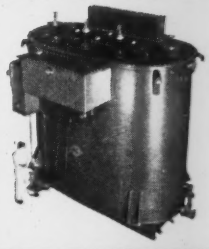
The arc furnace

Reduced costs result when Allis-Chalmers control, transformers and switchgear are specified for arc furnace application. The reason: A-C offers these products as a specially-integrated electrical system — designed by experts in furnace requirements and backed by Allis-Chalmers 75 years of experience in supplying equipment to the steel industry.

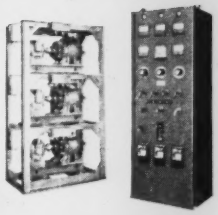
Wherever steel goes — from mine to final processing — Allis-Chalmers equipment is available to keep quality high, keep steel moving fast and profitably. Contact the A-C representative in your district, or write to Allis-Chalmers, Milwaukee 1, Wisconsin.



Arc furnace switchgear provides safe, dependable protection for transformer and related equipment. Special alloys assure long arcing contact life under severe interrupting duty, keeping maintenance and downtime to a minimum.



Transformers are of well-balanced designs and built for heavy duty . . . performance has been proven in 25-30 years of repeated daily short-circuits in electrical furnace operation.



. . . and Control requirements are met by Magnetic Amplifier and *Regulex* controls which balance arc current with arc voltage to maintain desired arc condition automatically. These controls result in high tonnage per kwhr, long life for electrodes and furnace linings, and a minimum of maintenance.

CHALMERS

A-C ALLIS CHALMERS

Regulex and *Texrope* are Allis-Chalmers trademarks.

A-5363

Fastener Facts

by Paul Tunison, Chief Engineer—Judson L. Thomson Mfg. Co.

DESIGN PRODUCTION & PURCHASING DATA

SHOULDERED RIVETS vs MACHINED PARTS

When design calls for fasteners that also function as pivots for moving parts, it pays to consider shouldered rivets first. They may look much like screw machine parts that offer similar shoulder and tenon combinations; but the similarity ends there.

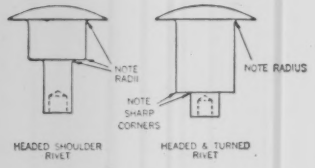
Rivets Cost Less!

Shouldered rivets cost only about half what you pay for their fully machined equivalents. That's because they can be cold-forged from solid wire in a single, high-speed operation. In most cases, no metal is removed, as with screw machine parts. So, you get all the stock you pay for.

Rivets Speed up Assembly!

Shouldered rivets are located and clinched by high-speed rivet-setting machines. Like semi-tubular rivets, they have shallow punched or drilled holes in their shanks to combine the shear and compression strength of solid rivets with low-cost fastening. On the other hand, comparable screw machine parts often require slow, costly hand locating and fastening.

Therefore, the savings in material and labor costs inherent in shouldered rivets demand their early consideration in cost reduction or value analysis programs. These low-cost, high-speed fasteners should be thoroughly investigated before designs are frozen in favor of more expensive screw machine parts.



Thomson Shouldered Rivets

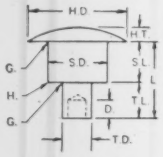
Thomson designs and produces shouldered rivets to specifications in two forms; completely cold-headed or cold-headed and turned, depending on permissible radius of corners and break of edges.

When close tolerances are not a factor as in folding baby carriages, car beds and seats, rollaway beds and comparable pivot-fastener applications, Thomson shouldered rivets are completely cold-headed . . . and, of course, priced at a minimum.

Where tighter fits are necessary, a secondary turning operation supplements the initial cold-forming to

square corners and edges to specified tolerances. Metal removal, of course is slight. As a result, these Thomson shouldered rivets cost slightly more than completely headed rivets, but much less then fully-turned parts.

Variables to Consider



In addition to permissible radius of corners (H) and break of edges (G), there are nine other design factors: head shape, the diameter (HD) and thickness (HT); shoulder diameter (SD) and length (SL); tenon diameter (TD) and length (TL); rivet length under head (L) and hole depth (D). Head shapes may be round, oval, flat, countersunk, or some special design. Because of all these variables, Thomson Shouldered Rivets are made to order after individual quotations.

Other Design Factors

It pays to think twice before you rule out shouldered rivets because of design and production consideration that seem to prevent insertion of rivet-setting machine's driver or anvil for clinching the rivets. In many cases, a slight change in spacing or cavity size allows use of rivets without changing overall dimensions. In other cases, a change in assembly sequence permits a profitable switch from costly hand assembly of expensive screw machine parts to low-cost machine-set rivets. Our engineering department, experienced in shouldered rivet applications, will be glad to offer suggestions while your designs are still in the rough-draft stage—at little or no cost.

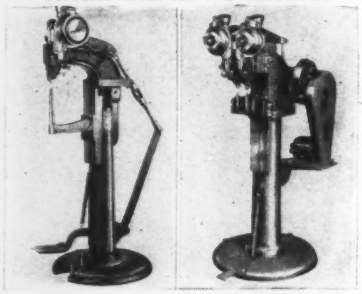
Materials and Finishes

Thomson Shouldered Rivets are produced from aluminum, brass, copper, nickel-silver, low-carbon steel, stainless steel and other materials. They can be plated with brass, cadmium, copper, nickel, tin, zinc, etc. They can also be oxidized or finished in japanned colors to match the original equipment or end product.

Thomson High-Speed Machines

The inherent economy of shouldered rivets as pivot-fasteners is multiplied by high-speed assembly made possible by automatic rivet-setting machines which can be operated by unskilled labor. Thomson, inventor of the first automatic-feed rivet-setting machine, has developed more than 250 styles which can do thousands of fastening jobs . . . with or without adaptations. Multiple rivet-setting heads, special work handling and loading fixtures are optional features that further accelerate assembly operations. Thomson will select and custom tool the proper machines to speed assembly and reduce costs in your plant. You can either buy or lease them and Thomson's sales-service engineers are available to keep them in top operating conditions.

TYPICAL RIVET-SETTING MACHINES



FLOOR-TYPE FOOT-OPERATED

FLOOR-TYPE MOTOR-OPERATED

Design and Engineering Service

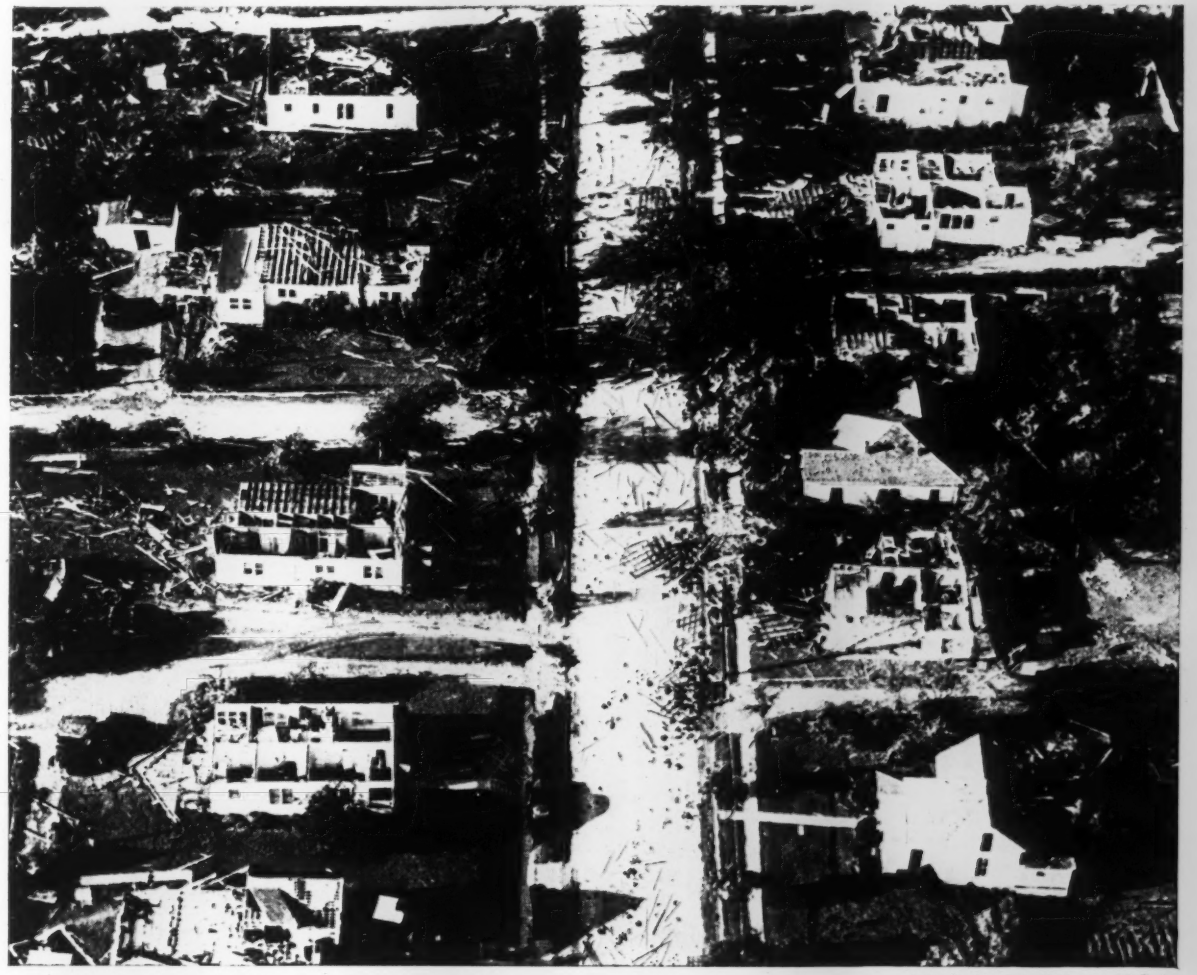
Contacted while designs can still be modified, we will analyze your pivot-fastening problems and tell you whether shouldered rivets are best for you . . . at little or no cost. Send sketches or prints, if samples are not available.

Free "Fastener Fact File"

Be one of the first to profit from our new manual on all phases of riveting. It covers rivet types, applications, materials, finishes and other factors that determine selection of the right rivet design and machine for cutting fastening costs. Reserve your copy today. Write: Judson L. Thomson. Mfg. Co., Dept. Waltham 54, Mass.

JUDSON L. THOMSON MFG. CO. WALTHAM 54, MASS.

See us at Booth 308 at the Design Show



Maple St., Small Town, U.S.A.

A TOWN WHERE "NOTHING EVER HAPPENS"...

A home town—like your town. A place where people said "it couldn't happen to us."

But it *did*. Like a whip, a great tornado lashed down Maple Street, splintering houses, leaving people hurt—homeless—panic-stricken.

A desperate call went out for the Red Cross and quickly, automatically, the team went into action.

Red Cross nurses slipped into uniform . . . volunteers set up first aid stations . . . canteens fed the hungry. Later, Red Cross money and work helped rebuild the town.

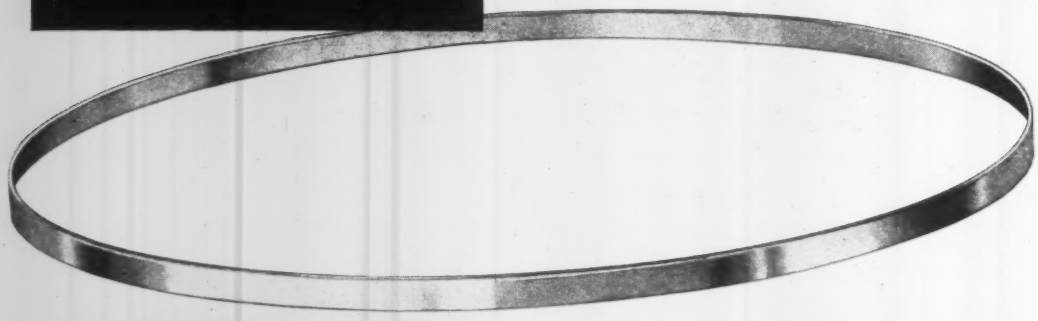
Last year was one of the worst disaster years of this century, and the year before, 1956, was almost as bad. Every month and in every state, the Red Cross strained to the limit as hurricanes, floods, tornadoes, forest fires swept across the country.

Red Cross receives no government funds—depends entirely upon *you* for support. Give as much as you can. Your dollars may go to your own town when it needs them most.

Join and Serve

SPACE CONTRIBUTED BY STEEL

Precision Rings with little or no machining



Today you can purchase precision flash butt-welded rings that require little or no machining to meet your specifications. Made from bar stock of finished gauge, they can be produced to meet the same tolerances as conventionally machined rings. Cost of production and materials of some rings has been reduced as much as 60%. Sizes and materials at present are limited to those bar stocks which can be furnished to precise finished dimensions. However, persistent efforts of American Welding engineers and the producers of finished bars give promise of a widening range of sizes and metals that can be manufactured by precision forming and welding.

This is another example of why you should call American Welding first — if the problem is circular and of metal.

New Products Catalog

Write today for 20-page catalog of circular products which American Welding can form, weld and machine for you.

AMERICAN WELDING

THE AMERICAN WELDING & MANUFACTURING CO.
110 DIETZ ROAD • WARREN, OHIO

Metalworking Outlook

Aluminum vs. Stainless

The price cuts in aluminum (Page 160) probably will not bring about a change in stainless steel prices. The two metals are most competitive price-wise in auto trim and architectural applications. Says one stainless producer: "When aluminum and steel meet in the market place, we sell quality rather than price." The move in aluminum is aimed primarily at copper, particularly in electrical uses.

AMC To Build the Mighty Mite

George Romney, American Motors Corp.'s president, has been saying his company is phasing itself out of defensework because it couldn't get contracts. He'll have to change his tune because the Army has just awarded a $5.5-million contract to AMC for a light truck, the Mighty Mite, which is scheduled for airborne use. Buildups aren't expected to start for a year. Other defense orders for recession-riddled Michigan industries include two contracts for $29.6 million to Chrysler Corp. for missilework and a $1.8 million job to Ingersoll-Kalamazoo Div. of Borg-Warner Corp. for jet assist takeoff work.

Housing: 1.3 Million Starts in '58

Look for housing starts to hit 1.3 million this year, instead of the 1.1 million originally predicted. The new federal housing bill will make the difference. It extends the loan programs for veterans to July 25, 1960, provides more money to buy Federal Housing Administration and veteran mortgages, lowers down payment requirements on FHA mortgages, and boosts the interest rate on GI loans to 4¾ per cent.

Breaks in the Clouds

The business weather outlook is still gray, but there are breaks in the clouds: Industrial building costs have leveled off for the first time in four years, according to Austin Co.'s index. The American Gear Manufacturers Association's index for February showed volume in the gearing industry was 2.1 per cent higher than it was in January. "Productivity is clearly on the increase in many construction areas," says Austin's chairman, George A. Bryant. In the first two months of 1958, total construction awards were running 10 per cent behind 1957's pace.

Time To Improve Labor Policies

Now's the time to adopt sound long term industrial relations policies, says Sumner H. Slichter, Harvard economist. While some progress has been made, he believes more is needed to: Improve arrangements for handling grievances; deal better with discipline; improve production standards or wage

Technical Outlook—Page 101 Market Outlook—Page 135

incentives; develop better job evaluation plans; and redesign seniority arrangements. A firm stand is more possible this year than in many former periods because there is less danger of strikes.

Hawaii To Get First Steel Mill

Mid-Pacific Rolling Mills Ltd. has been formed in the Hawaiian Islands by Harry B. Kronick and Louis Dulien, principals in National Metals Co., Honolulu, and Dulien Steel Products Co., Seattle. Mid-Pacific, to absorb National Metals' facilities, will convert Hawaiian scrap to reinforcing and structural steel for use by the islands' construction industry. A $1-million mill is expected to be in production by January, 1959.

3.7 Million-Ton Mill in Siberia Planned

Russia's expanding steel industry includes the prospective construction of an integrated plant in western Siberia. It would have a capacity of 3.7 million tons of rolled products a year and a force of 30,000 employees. Russia's Asiatic territory holds promising iron deposits, substantial coal reserves, and a large hydroelectric power potential. Anticipating a nickel shortage, Soviet metallurgists will use manganese as an austenite-forming element. The observations were made by a team from the American Institute of Mining, Metallurgical, & Petroleum Engineers which visited Russia.

Direct Reduction: Still Another Process

Add the Strategic-Udy Process to other entries in the race to find commercially acceptable ways to direct reduce iron ore. Strategic-Udy employs a rotary kiln for partial reduction and an electric furnace for final reduction of unbeneficiated ores to pig or semisteel. Combustible gas from the electric furnace furnishes part of the fuel. Kiln feed is iron in any form (even flue dust), flux, and cheap carbon fuel. The process isn't ready for the big steel producing centers, but Strategic Materials Corp., Niagara Falls, Ont., and Koppers Co., Pittsburgh, have joined to explore its feasibility for low-grade ore and poor fuel areas.

Straws in the Wind

Sharon Steel Corp. is experimenting with oxygen steelmaking and direct reduction processes . . . Copperweld Steel Co. has a new product, Alumoweld, an aluminum-covered steel rod which can be redrawn into wire; limited production starts this month . . . International Nickel Co. of Canada expects to spend $60 million or more on capital additions in '58, compared with the previous record of $43.9 million in '57 . . . Manufacturers' inventories, on a seasonally adjusted basis, hit $52.5 billion at the end of February, down $400 million from the previous month; durable goods showed the biggest liquidation . . . Britain's domestic steel prices have been cut to save users about $28 million a year . . . National Cylinder Gas Co. will be renamed Chemetron Corp. after the chemical, metal, and electronic industries it serves.

"How can we squeeze 2½¢ out of production costs?"

Questions like this are nothing new to Ryerson specialists.

With their broad experience in steel applications, they can often suggest ways to save—a different type or analysis, steel in ready-to-use form, or an improvement in fabrication methods that will shave a few pennies off the final unit cost without impairing quality.

Add to this service the nation's largest steel stocks, unequaled processing facilities, fast delivery to meet any emergency—and you have the reasons why more steel users call Ryerson.

RYERSON CERTIFIED QUALITY

RYERSON STEEL

Member of the INLAND Steel Family

Principal Products: Carbon, alloy and stainless steel—tubing, bars, structurals, plates, sheets—aluminum, industrial plastics, metalworking machinery, etc.

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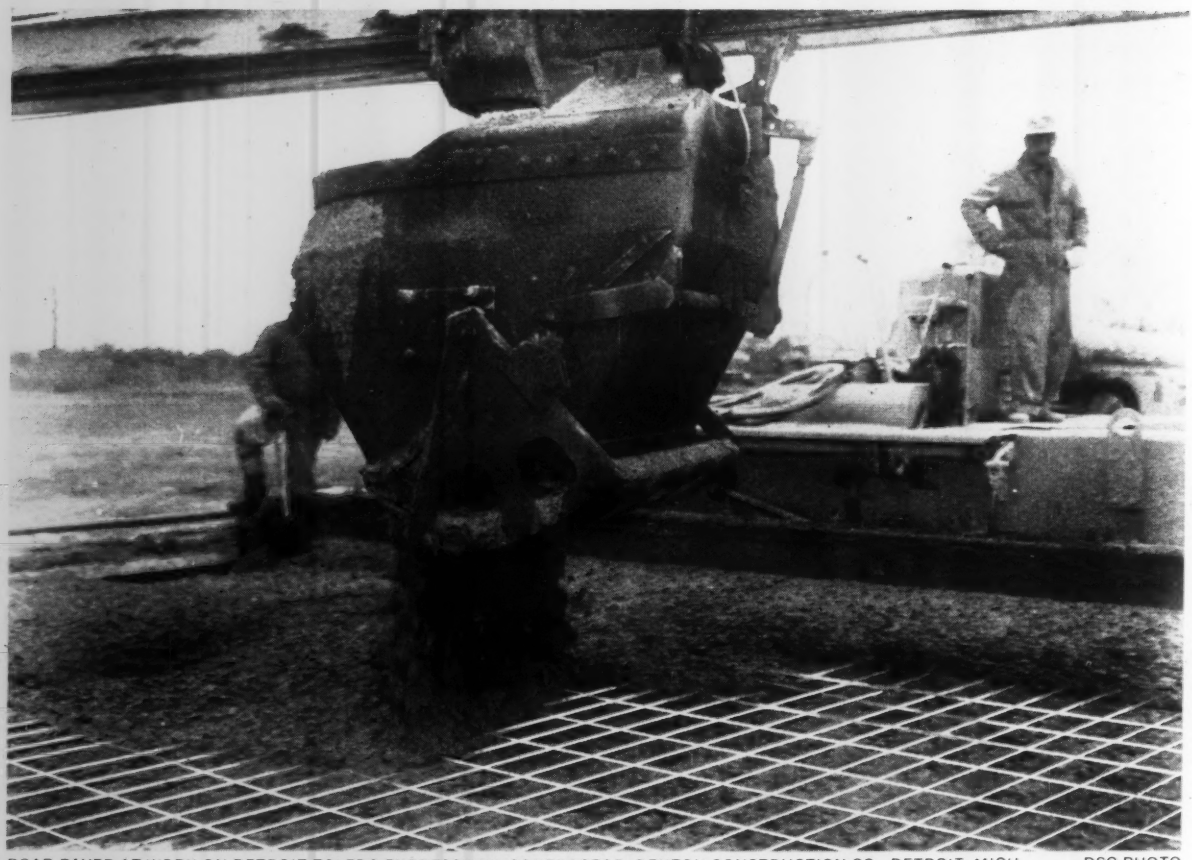

ROAD PAVER AT WORK ON DETROIT-TOLEDO EXPRESSWAY. CONTRACTOR: DENTON CONSTRUCTION CO., DETROIT, MICH. DSC PHOTO

DSC Electro-Welded Wire Fabric Makes Concrete Crack Resistant

WHAT IT IS—DSC Fabric is a money-saving means of supplying the needed tensile strength which concrete commonly lacks. That explains its engineering function in the building of roads and structures and in fabricating concrete pipe and other precast concrete products.

Portsmouth mesh consists of DSC Bright Basic L. C. Reinforcing Wire. The wire intersections are electrically welded to produce a continuous lattice-work mat.

DSC Fabric conforms to ASTM Specification A-185-56T—PROOF of PERFORMANCE of DSC STEEL . . . on the job.

HOW IT SERVES THE PUBLIC—DSC Fabric promotes easier, smoother, faster and *safer* highway driving; saves tax money by reducing initial and maintenance costs of public roads, structures, sewerage and general drainage systems; protects buildings against cracks, leaks, vermin.

For more information on DSC Fabric and its uses . . . or about other DSC Rod and Wire Products . . . or DSC Sheet and Strip Steel—please write DSC General Sales Office or call your nearest DSC Customer "Rep" . . . today?

Customer Satisfaction Is Our Business

DSC MILLS AND PRODUCTS

PORTSMOUTH DIVISION, PORTSMOUTH, O.

Coke • Coal Chemicals • Pig Iron
Basic OH Steel Ingots • Blooms • Slabs • Billets • Rods
Hot Rolled and Cold Rolled Sheets • Low and Medium Carbon
Manufacturers' Wire • High Carbon Specialty Wire • Aluminum Cable Strand
Reinforcement • Rope Wire • Tire Bead Wire • Welded Wire Fabric

MILL DIVISION: DETROIT, MICH., HAMDEN, CONN.

Cold Rolled Carbon Steel Strip
Flat Cold Rolled Carbon Spring Steel

DSC 35TH ANNIVERSARY YEAR

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DETROIT STEEL CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

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How High Is Unemployment?

Within the next few days, the U. S. government will issue its unemployment figures for March.

Reported as bare statistics, they will make distressing news that can be taken as evidence of a deepening of the recession.

In a period when psychological influences can affect our future so profoundly, we think these statistics need careful explanation and interpretation. Many of the changes in employment are resulting from a great variety of economic and social forces now at work.

Based on reports from 100 representative plants in Cleveland, it is a safe bet that national unemployment in March rose to at least 5.5 million.

That total is 300,000 higher than February's and 2.6 million higher than the year-ago figure. To find a comparable high, you must go back to 1941 when 5.6 million were unemployed.

But the number of jobless does not look so bad in terms of population growth, additions to the labor force, and the number of people still working.

This table tells the statistical story for the current period, the last two recessions, and the prewar period:

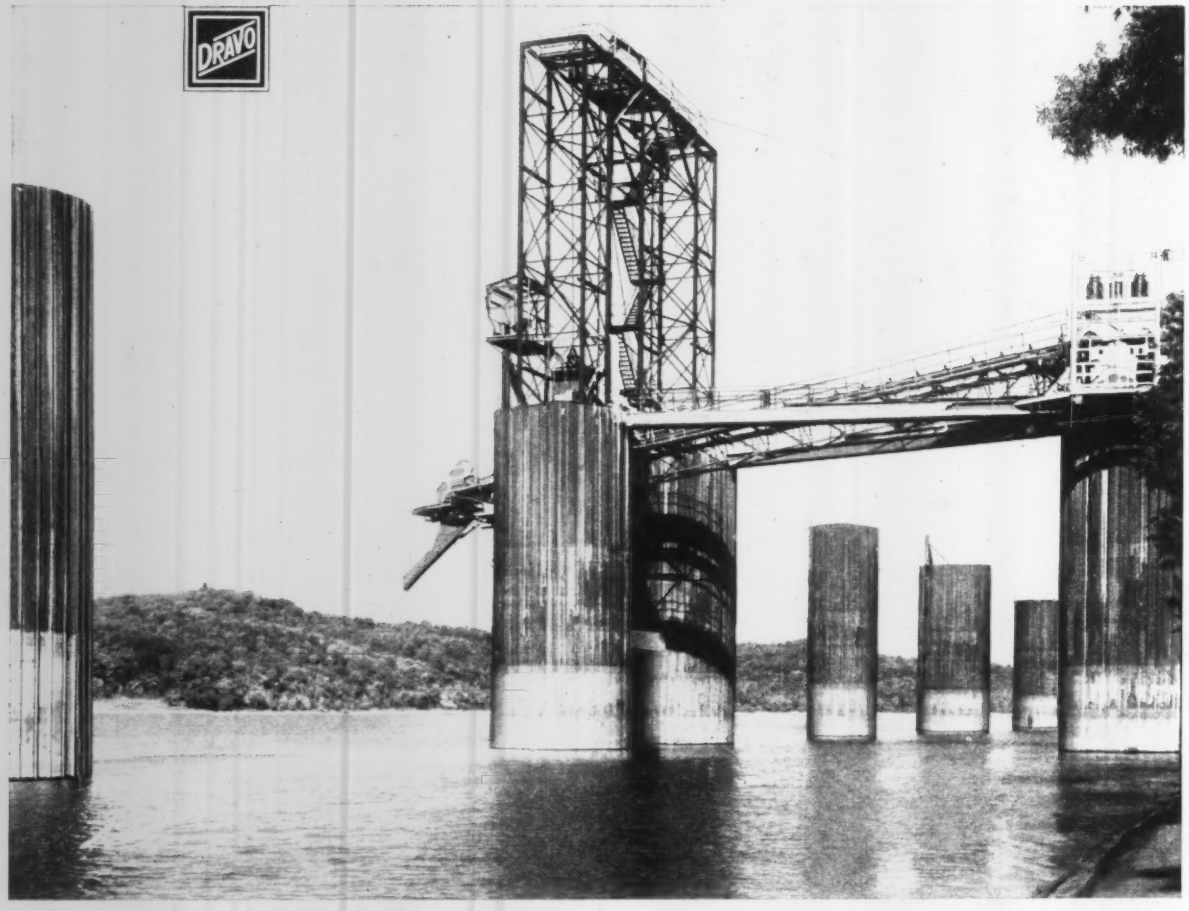
	1958	1957	1954	1949	1941
	(March figures in millions)				
Population	173.2	170.3	161.5	148.0	133.0
Labor Force	67.2	66.8	63.8	61.0	55.9
Employed	61.7	63.9	60.1	57.8	50.3
Unemployed	5.5	2.9	3.7	3.2	5.6

Since 1941, population has increased more than 40 million, the labor force more than 11 million. Both are still growing. Population is gaining at a rate of 250,000 a month, the labor force 100,000 a month.

A large portion of unemployment is concentrated in metalworking, including steel, other metals, machinery, and transportation equipment. Soft goods and the trades are holding up well.

We agree that unemployment is high, but when all the facts are taken into account, we don't think the picture is as black as it appears to be. Unemployment could get still higher without becoming too alarming.

Irwin H. Such
EDITOR-IN-CHIEF



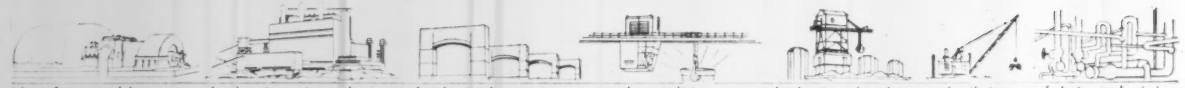
"MILLION TON" dock for new DeKoven Mine

Pittsburgh & Midway Coal Mining Company can load more than a million tons of coal annually at this modern, cellular type barge dock near Sturgis, Kentucky, on the Ohio River. A two-mile long, 42 inch conveyor belt connects the facility with the company's new DeKoven mine.

Eleven cells, three of which support the loading mechanism, are spaced along 1175 feet of shoreline. Constructed of interlocking sheets of steel piling driven to rock, each cell is filled with sand and gravel and topped with concrete. Ruggedness, economy and minimum maintenance make this an ideal type of dock for most purposes.

In the past eight years, Dravo has installed more than 100 of these docks for firms in the chemical, steel, coal, utility, railroad, petroleum and other industries. For more information on this or any of the products and services shown below, write to DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

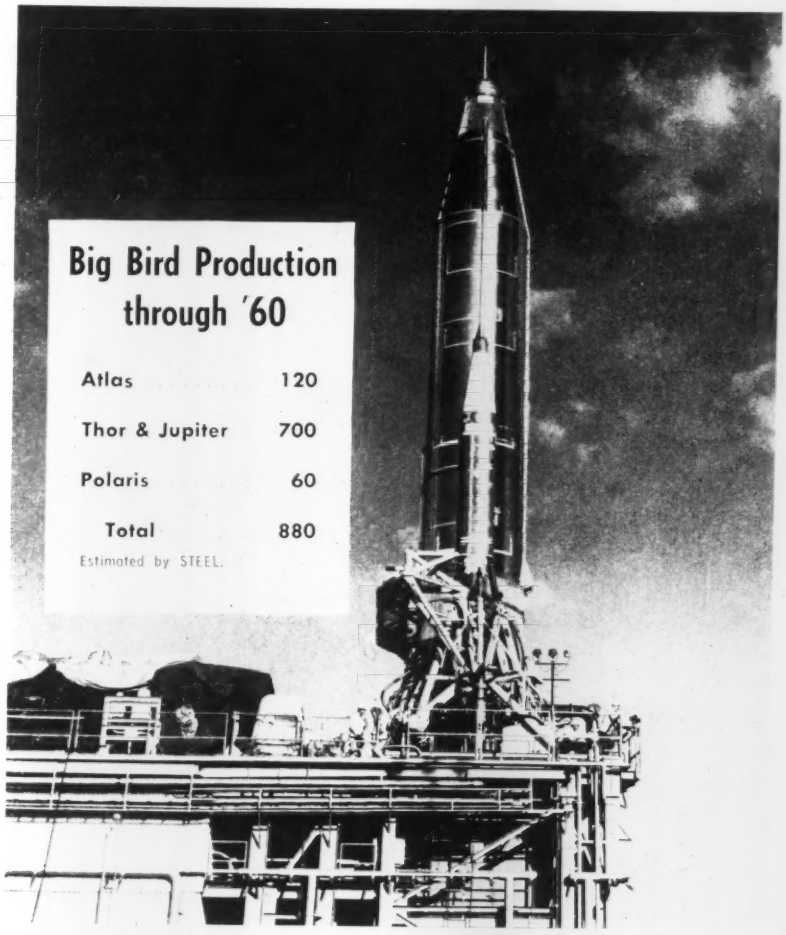
DRAVO
CORPORATION



Blast furnace blowers · boiler & power plants · bridge sub-structures · cab conditioners · docks & unloaders · dredging · fabricated piping

foundations · gantry & floating cranes · gas & oil pumping stations · locks and dams · ore & coal bridges · process equipment · pumphouses & intakes

river sand and gravel · sintering plants · slopes, shafts, tunnels · space heaters · steel grating · towboats, barges, river transportation



Pointing skyward, the Atlas missile is one of many as . . .

Missile Arsenal Builds Up

THE NUMBER of missiles built the next three years will be disconcertingly small for manufacturers analyzing the profit potential of our defense program. Pentagon estimates indicate about $3 billion will be spent on missiles in 1958. Projecting the trend curve, STEEL estimates spending in the 1958-60 period will approach $13 billion.

Ballistics—About $3 billion will pay for the production of fewer than 1000 ballistic missiles. Research and development will get $5 billion, and $5 billion will remain for the production of about 30 types of nonballistic missiles which can be produced in something approaching quantity.

A $3 billion estimate for ballistic missiles is based on present programs and those reportedly favored by Congressional leaders:

- Atlas, if operational by 1959, should be produced at the rate of ten a month by the end of 1960. Perhaps 120 will have been produced by then.
- Polaris, scheduled to be operational by 1960, is timed with the production of submarines to fire it. Unofficial plans call for five subs to be ready by 1960, each capable of firing a dozen or so missiles. If the goal is realized, 60 Polaris missiles may be built before Jan. 1, 1961.
- Thor and Jupiter are officially scheduled to be operational by the end of this year. Unofficially, 100 may be deployed overseas. In 1959-60, guesses a source close to the missile industry, about 600 can be built without straining production facilities.

Assuming a cost of $2 million for each Atlas and $1 million for each Thor, Jupiter, or Polaris (industry estimates of production costs), the total tab for hardware could hit $1 billion. Another $2 billion would furnish ground support equipment, launching sites, spare parts, technical facilities, and submarines for the Polaris.

Nonballistics—Around $5 billion in production money should be available for guided missiles. That would buy 8000 Snarks, or 10,000 Reguluses, or 80,000 Matadors, say industry sources. Of course, the production figures aren't possible because the $5 billion must also finance 27 other missiles—and the production of some will hit several thousand. LaCrosse production passed the 1000 mark long ago; Falcon production will run high; Nike production of Ajax type (already over 1000) will be replaced with Hercules type.

Long Range—Polaris production will reach the 1200 mark if some congressmen get their wish for 100 launching subs—but only 360 if a reported Navy program for 30 subs over a ten-year period pans out. Totals should be doubled if back-up missiles and spare parts are counted.

Production of ICBMs will never surpass that of B-52s, which they are designed to replace. And that won't happen soon, considering recent statements by Air Force officials that the ratio of manned bombers to missiles in the Strategic Air Command will remain in favor of bombers well into the 1960s.

How Two Organizations Used Research Labs

New Product . . .

- **PROBLEM**—Life Time Products Corp., Los Angeles, built a portable end lift car jack for garage and service station use. But newer cars caused problems: Some were too low to get the jack under; on others, the pickup point couldn't be reached with a fixed set of hooks.
- **OBJECTIVE**—It took the problem to Designers for Industry, Cleveland. DFI's market survey coupled with Life Time's experience, showed a need for: 1. Universal pickup arms. 2. Pneumatic actuation. 3. Capacity to lift 3000 lb with maximum of 150 psi air pressure. 4. A 5 to 10 per cent weight reduction, compared with the old model. 5. Good maneuverability. 6. Ability to stand on end for storage and shipping.
- **SOLUTION**—The old model couldn't be modified to meet the specs, so a new concept was needed. A scissorslike mechanical linkage system and vertical placement of the pneumatic cylinder solved most of the problems. Use of formed, high tensile sheet steel instead of structural shapes for the box saved weight. Spotwelding was found to be Life Time's most economical joining method.
- **RESULTS**—DFI built a one-fourth scale model prototype and furnished working drawings. From start to finish, the project took six months. Side benefits: Improved appearance, savings on assembly costs, patentability.

New Material . . .

- **PROBLEM**—Wright Air Development Center, Dayton, Ohio, wanted a material suitable for bearing retainers in aircraft gas turbines. It took the problem to Horizons Inc., Cleveland.
- **OBJECTIVES**—Horizons' research showed that the material would need a duplex surface—one soft phase and one hard phase.

  Requirements of the soft phase: 1. Low adhesive affinity. 2. Softness (but not molten) at operating temperatures. 3. Replenishable when worn away.

  Requirements of the hard phase: 1. Provide a small true contact area. 2. Not interfere with lubricant action of the softer phase.
- **SOLUTION**—Horizons developed a heterogeneous alloy containing silver as the soft phase and a nickel-base material with silicon and molybdenum disilicide or chromium boride additives as the hard phase. Powder metallurgy was the most efficient fabrication technique. Silver was added by infiltration.
- **RESULTS**—1. Operating temperatures were increased to 800° F. 2. Wear rates are lower at elevated temperatures than at room temperature. (Some tool steels, rubbing against the cage and seal materials, form oxide films which are tenacious and act as a lubricant. They retard wear which occurs from galling.)

Should You Buy Research?

THREE out of five metalworking companies plan to introduce new products in 1958. Many others will bring out new processes. Numerous problems accompany such introductions. How can they be solved?

One way is to hire an independent commercial research laboratory. Numbering over 600 in the U. S. (a National Science Foundation directory lists 563 of them), they define their business as "problem solving." They should not be confused with the nearly 4000 other independent laboratories in the country that work in the areas of testing or engineering design.

The research labs' services run the gamut from basic research to product design. They also conduct technical market surveys and engineering audits, do process engineering, and tackle a wide variety of research and development problems. Most of them specialize in certain types of products, materials, or industries.

Operating as an "arm" of your company, in a staff position, they are subject to your directions.

When You Need One

You won't want to hire an outside firm for a problem that your own staff could readily solve. Ask yourself how big and pressing the problem is and what you will lose if it's not solved. Define the objectives and specific boundaries of a problem before deciding whether to farm it out. Maybe it's not as difficult as it seems.

And don't settle for anything less than the best solution. Perhaps your own people could find the best mechanical answer to a problem but the most profitable one might lie in use of hydraulics, pneumatics, or electronics. That's where a lab can pay for itself fast. Here are some points to consider in determining whether to go outside:

Lack Knowhow?—Does your technical staff have the over-all knowledge to solve your problem? Outside firms bring you experience from many industries: Knowledge picked up in divergent fields can often be converted into background for your project or even a solution to your problem. The lab may have run into a similar situation before: It can make short cuts and avoid costly blind alleys. That's a good point

to consider when you're exploring a new field.

Lack Facilities?—Do you have the space and equipment needed to work on the problem? If you do, can you afford to release it from other jobs? You probably won't want to buy a lot of equipment for a temporary project. And maybe you can't afford the investment needed to do advanced research.

Says J. E. Burnett, vice president, Designers for Industry, Cleveland: "The lab can bring you the same facilities for a $2000 project that you'd need for a $2 million one."

And you get the added advantage of isolating your research project from day-to-day production worries. "When you take men off a research program to solve a production problem, you not only lose time but do the more serious damage of interrupting the thought of the researcher," points out Roger A. McIntyre, director of sales, Horizons Inc., Cleveland.

Lack New Ideas?—A good indication that you need an outside firm is failure to come up with new ideas for solving an old problem. Perhaps a fresh outside point of view is needed. It's too easy for your own staff to develop a preconceived notion of what the end result should be.

It also offers you flexible thinking and "new blood." You could get that by hiring some new people, but could you profitably keep them busy with subsequent projects?

Lack Time?—In bringing out a new product or process, timing is of the utmost importance. Ask yourself whether you'll save enough money by letting your own team develop it to make up for the probability of a later completion date.

"Because we don't have to spend as much time gathering background data and chasing down blind alleys, we can sometimes complete a project in half the time it would take a captive group," says the manager of one research lab.

Other Points—Labs also offer:

- Absolute secrecy.
- Specialists for selected phases of a program.
- A solution to the technical manpower shortage.
- Complete contractural control by you of results and expenses.
- Ability to handle unusual problems.
- Cross-fertilization of ideas, drawn from fields outside your scope.
- Transition manufacturing of a new product. (They'll produce the first few for field tests or initial sales.)
- A check on your staff's conclusions.
- Tax advantages. (You can "expense" their charges.)

Choose the Right One

Before you go shopping, know exactly what you want the researcher to do. The more clearly and specifically you can define the problem, the more economical, rapid, and precise will be the solution. Warning: Don't select a firm until everyone in your company who must approve and work on the project understands the objectives.

Look Around — Try to visit at least two or three firms before hiring one. Examine their facilities and talk with the top management as well as the men who would work on your problem. Remember that the lab's personnel become a part of your staff while on assignment. Are they the kind of people you'd like to have on your payroll? Make sure they have the experience and interest to tackle your problem. Satisfy yourself that they'll work for you rather than your people for them.

Reputation—Find out who some of the firm's clients are and the repeat customers it has had. Call a client who has had a problem in the same area as yours.

Workload — Make sure the firm has the time to do the job. That's what you're paying for — time, experience, recommendations. Can it offer you a schedule consistent with your project requirements?

Warning—As in any fast-growing business, a few quacks are willing to take advantage of the unwary. That legal maxim—let the buyer beware—is good advice when you're research shopping.

The size of a firm is no absolute indication of its ability; some small labs offer topnotch specialized services.

Labs Work In:

Acoustics	Lubricants
Aerodynamics	Materials
Aeronautics	Mechanical engineering
Air pollution	Metallurgy
Automation	Missiles
Bacteriology	Nuclear physics
Batteries	Operations research
Building materials	Ore processing
Carbon	Paint
Ceramics	Photography
Chemical engineering	Physics
Chemistry	Plastics
Civil engineering	Propellents
Coatings	Quality control
Combustion	Radiation
Computers	Safety
Containers	Sanitation
Corrosion	Spectrography
Design	Ultrasonics
Electrical engineering	Waste disposal
Electronics	Water
Fuels	Wind tunnels
Hygiene (industrial)	X-rays
Ignition	Plus many others
Instruments	
Isotopes	

Source: National Science Foundation.

Define the Realm

When you've selected a firm, it should be asked to submit a formal proposal. That should cover:

1. Objectives—function of the project and desired end results.
2. Scope—how results should be obtained and range of activity.
3. Discourse—mutual technical understanding of the problem. It might include the lab's prior experience in this area and any development work your staff has done.

Points out Mr. McIntyre: "The client is the expert with many years of experience in his particular field. He won't want us to dig for information he has acquired at considerable time and expense."

4. Outline—detailed explanation of the functional procedure.
5. Budget—detailed estimate of dollars and time to be spent on each phase. (This is a good guide in evaluating performance while the project is underway.)

The average cost is $8 per manhour spent on the job, but there is seldom an average job. Yours might cost less—or more. It depends on the quality of men you'll need: Some come as high as $150 a day. Of course, you'll be billed for any materials needed (usually with a small markup). Some labs charge overhead on facilities devoted to your project, but most include that cost in the manhour billings.

Bring 'Outsider' Inside

Remember that the project is a joint effort of your organization and the research lab. So chose your

liaison team carefully. They'll have to answer a lot of questions during the program, so they should have a good knowledge of the problem, your organization, capabilities, limitations, policies, and procedures. The lab makes recommendations, but you must make the decisions.

Members of the liaison team should know the reasoning behind all recommendations—not only why one method was chosen but why others were not. They should equip themselves to train people needed to effect recommendations. (Some labs will do that, too, but it's generally cheaper to do it yourself.)

Maintain a close relationship between your team and the lab men. Tell your people why the research unit was called in so they won't take the move as a lack of faith in their ability.

Evaluate Performance

Plan scheduled conferences to jointly review the project. Most labs will submit monthly progress reports. (It might be necessary to negotiate this point before hiring one.) Reports should tell what the lab did, why, with what results, and what it intends to do, why, and anticipated results. That's plus any recommendations that can be made which you might want to implement immediately. Don't force opinions until they're ripe, however.

The final results are often presented as a report. Decide in advance who'll peruse it (board of directors, technical management, production people, or all three?) and what type of report is needed (how-to-do-it, why-it-was-done, or a finished product or process ready to go to work for you).

You can call in a lab at any phase in development of your project. You can also terminate its services at any time—usually with a 30-day notice.

When the researchers leave, the job's not done. You still have to put the results into effect and exploit your investment. You should also get to work on any other ideas turned up by the research. And the experience gained by your people should stimulate them to new technical horizons.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Bluecollars Go White

International Business Machines initiates a policy that shifts 20,000 workers from hourly to salary basis at same pay. Company cites three employee advantages

HOURLY WAGES are extinct in International Business Machines Corp. plants. The company has put all its 20,000 hourly workers on salary.

Compensation rates remain the same: A worker who formerly made $2 hourly gets $80 for a 40-hour week. Overtime is unchanged: Time and one-half is paid for all work over eight hours in a day or 40 hours in one week.

Reason—IBM, a nonunion company, sees three worker benefits resulting from the move, says Ralph Harris, director of personnel:

1. Being on salary raises a worker's status at home and on the job.
2. Greater sick benefits accrue to salaried people. Hourly workers formerly received $6 daily for the first three days of illness, then full wages up to six months. Now they'll draw full pay from the start for six months.
3. Employees' pay will no longer be docked for reasonable personal absences from work.

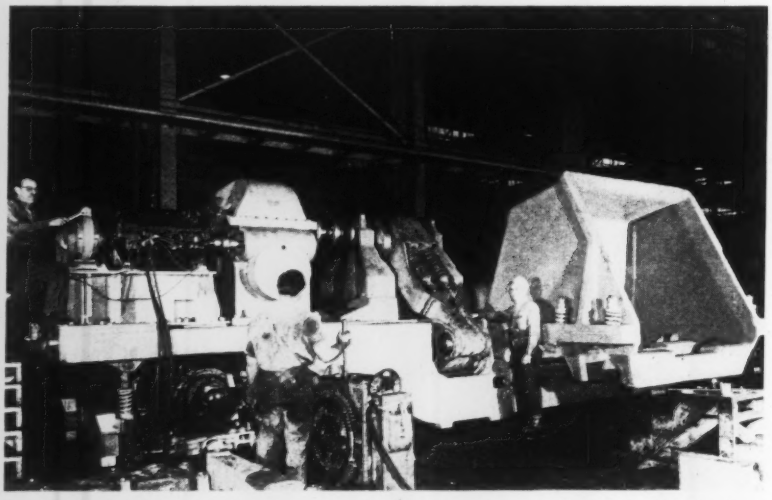
Philosophy — Company officials say the program merely recognizes employees' needs and desires. T. J. Watson, president, adds: "I want this company to be thought of as the one with the greatest respect for the individual."

That philosophy sparked IBM's "open door policy." If a plant employee has a problem that can't be solved by his immediate supervisor, he can carry it all the way to the office of the president.

An indication of worker response: IBM's employee turnover consistently runs one-fifth to one-seventh of the national average.

Attitudes—To measure employees' opinions of company personnel policies, IBM had Opinion Research Corp., Princeton, N. J., conduct a survey last month in its Poughkeepsie, N. Y., plant. Of the 8329 eligible employees, 6203 answered a confidential questionnaire.

Results: Employees like the company best for such things as pay, steady work, fringe benefits, and good working conditions. About 91 per cent thought their company was



REMOTE CONTROL from operator's pulpit will govern this ingot buggy built at Blaw-Knox Co.'s Wheeling, W. Va., plant. An electronic high frequency carrier system positions the car at soaking pits and mill receiving table. Ingot discharge is automatic. The car will carry ingots from pits to a new Blaw-Knox slabbing mill at Kaiser Steel Co., Fontana, Calif.

tops, 71 per cent felt the same about their jobs, and 69 per cent rated their departments that way.

Salarywise, 55 per cent felt they were paid more than another company's employees doing the same job; 30 per cent thought rates were equal. (IBM bases its wage scales on three factors: Value of the job to the company; skill, education and experience required for the job, and rates of other companies for comparable jobs.)

Of greatest satisfaction to management was the answer to this question: "If you can choose, will you be working for this company five years from now?" About 56 per cent of the employees answered "certainly will"; 29 per cent said "probably will." Only 2 per cent gave a flat "no."

IBM officials won't predict whether they've set a precedent with their new salary plan, but several nonunion companies have already requested information. It's a safe bet industry will follow the experiment with interest.

Safety Record Set in '57

The iron and steel industry set a safety record last year, says Benjamin F. Fairless, president, American Iron & Steel Institute.

The accident rate in 1957 was 3.48 disabling injuries per million manhours worked, compared with a 12 per cent higher rate in 1956, Mr. Fairless told the President's Conference on Occupational Safety in Washington.

Use of Steel Is Recorded

Over 80 per cent of total steel consumption by U. S. metal fabricating industries is in 11 states, says the American Iron & Steel Institute.

Michigan leads. Ohio is next. The others, in order, are: Pennsylvania, Illinois, New York, California, Indiana, Wisconsin, New Jersey, Texas, and Missouri. Each accounted for over 1 million net tons in 1954.

The institute used statistics compiled by the Bureau of the Census for its compilation. Latest figures cover 1954 and are comparable with 1947 data.

German Exports Dip

Decline may continue until end of summer despite fact steel industry recession is mild

THE SLIGHT RECESSION in West Germany's iron and steel industry has bottomed out. Domestic demand and output were little affected, but exports showed a definite downtrend. This is especially true of exports to nonmember countries of the European Coal & Steel Community. In March, 1957, orders from these countries totaled 230,000 tons. By January, 1958, they were down to 70,000 tons. The decline is expected to continue, possibly until the end of this summer.

Big tube producers, such as Phoenix-Rheinrohr AG and Mannesmann AG, have suffered most because they export 35 per cent of their output. Only 18 to 20 per cent of West Germany's rolled steel production is exported. Six blast furnaces have been idled and two or three plants have introduced short workweeks (24 hours), but this has affected relatively few workers. Some plants have cut production 10 per cent.

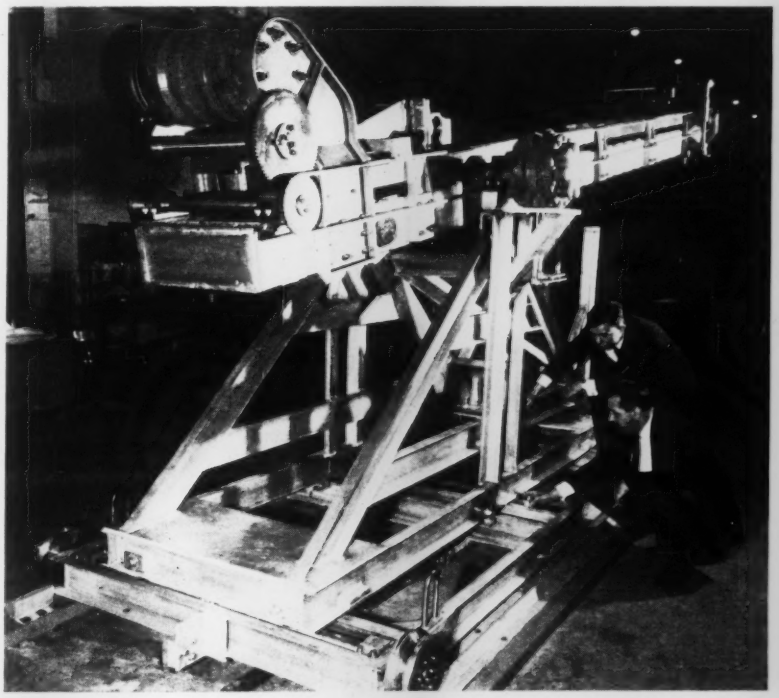
The West German steel industry's incoming orders for February, this year, were only 84 per cent of the monthly average for 1957. Result: Order backlogs are dropping.

Less Wait—Delivery dates have dropped to three or three and one-half months as against six to eight months a year ago, and some products can be had even sooner.

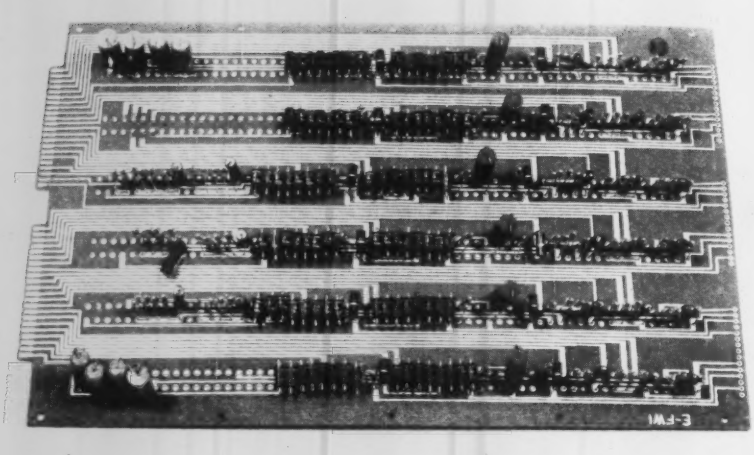
Steel Prefabs May Boom

Low-cost prefab steel homes and utility structures may be available in the near future, reports the American Iron & Steel Institute. It says the demand for steel prefabs comes primarily from farms and industry but that the idea of do-it-yourself homes is gaining impetus.

The institute says an entire structure can be delivered as simply as a large appliance, factory prepunched and pre-engineered, to facilitate assembly. Cement foundations are unnecessary.



HANDLING OF RADIOACTIVE MATERIALS under 18 ft water will be aided by this loading machine. It was built for Westinghouse Electric Corp. by the mechanical division of General Mills Inc., Minneapolis. The machine operates on its own small railroad tracks. It will be installed later this year in the Westinghouse testing reactor, under construction at Waltz Mill, Pa., to handle experimental containers, or "thimbles," 18 ft long and 2½ in. in diameter



Computer package utilizing printed circuits was dip soldered by Photocircuits Corp.

Printed Circuit Sales

1962*	$20 million
1958*	10.4 million
1957	9.4 million
1956	8.5 million
1955	4.5 million
1954	2.3 million

*Projected. All other figures estimated by STEEL.

Printed Circuits Level Off

PRINTED CIRCUIT sales flattened out somewhat in 1957 after nearly doubling annually from 1954 through 1956.

Reasons—The drop in the rate of increase is attributed to market saturation. First applied in the Manhattan Project, printed circuits are used primarily in the radio and television industry. "Indications are that this field is 85 to 90 per cent saturated," says William Mogg, sales manager, special products, Clevite Corp., Cleveland.

The leveling influence brought the demise of many small manufacturers who had entered the field with unlimited optimism but little experience or capital. A spokesman for the Institute of Printed Circuits (IPC), Chicago, says: "Overly optimistic publicity concerning profits in the field prompted innumerable small businessmen to clean out their basements and go into the business." A number of large electronic component firms have withdrawn from the field because of slim profits resulting from overcapacity and cutthroat competition.

Buyers' guide listings can be found for over 200 producers of printed circuits, but industry sources indicate less than one-fourth of these are "seriously" in the business. The IPC estimates a 38 per cent annual turnover in the active venders in the custom fabricating field.

Future Uses — Manufacturers are looking for profits in increased volume of printed circuits in weapons (controls and guidance systems), radar, telemetering equipment, appliances (chiefly in controls for automatic washers and dryers), electronic computers, and automobiles. Says R. G. Zens, vice president, Printed Electronics Corp., Natick, Mass.: "Almost every type of industry producing in volume is investigating automation. With the growth of automatic production techniques, increased use of printed circuits will naturally follow."

Advantages—Proponents of printed circuits claim the industry has grown because of three factors: Simplicity, reliability, and lower cost.

Printed circuits can replace cumbersome wiring in many types of electrical equipment. Says Mr. Zens: "It would have been almost impossible to build many types of large computers without printed circuitry." Printing has allowed increased freedom of design, simpler building, and easier repairing of items such as radios and television sets.

Manufacture—Besides those printed, some circuits are plated, etched, embossed, pressed from powder, or stamped. Circuit bases may be of standard phenol-fiber laminates, nylon or Teflon-base materials, or any of a number of ceramics. There are also several different ways to make printed circuits.

The most popular technique begins with a drawing of the circuit which is photographed. The negative is used to transfer the pattern to the circuit board. The board may be a copper clad laminate in which case portions are etched away leaving a pattern of conductive lines. Copper can be placed on plain laminate in the desired pattern, or, if a plastic base is used, an acid-resisting pigment outlines and protects areas that will form the circuit. It is also possible to coat a plastic board with photosensitive pigment and develop the image on it.

A ceramic base may be printed directly using a silk screen or by bonding an already prepared element to the base.

Problems—As printed circuits increase in popularity, testing and quality control procedures must be adapted to remain efficient. Major problems involve proper alignment and sharpness of conductive lines. Dust in the plant can create havoc with photographic techniques (dust on the negative causes a flaw in the circuit).

Still not solved completely is the problem of the proper adhesive holding the conductor to the base.

Plating and etching solutions, soldering temperature, and differential expansion and contraction of the base all make adhesion difficult.

Prices—Since the field is crowded and highly competitive, prices are continually fluctuating and price cutting has been fairly common. Indications are that expenditures for raw materials account for about 52 per cent of selling price on commercial type circuit panels, and 22 per cent on smaller quantity military, instrument, and industrial type runs.

Custom manufacturers make an estimated 43 per cent of the panels used commercially, and 70 per cent of the higher quality parts used by the military and by industry. Some companies (such as Admiral Corp., Philco Corp., or Radio Corp. of America) make circuits only for their own use.

Outlook—Look for increased use of printed circuits and a continued leveling and maturing of the industry. Sales will continue to climb, reaching an estimated $20 million by 1962. Most "basement" producers should be out of the field by then.

Consensus among successful manufacturers: Printed circuits can offer a lucrative future—if the producer has sufficient knowhow and capital.

No Wage Hike till November

RECOGNITION of the economic facts of life is beginning to appear on both sides of the bargaining table.

Minneapolis-Moline Co. and United Auto Workers' Locals 1132 and 1146 have worked out an agreement deferring a 10 cents an hour wage hike until Nov. 1, the start of M-M's 1959 fiscal year. Other features include: 1. Improvement in the vacation plan starting in 1959. 2. A review (beginning July 1) of certain skilled trade classifications. Some adjustments are possible.

"Our bargaining sessions were realistic," says Paul McDonald, industrial relations manager. "We told the union our operating results did not justify a wage increase at this time. They were well aware of the economic situation, and negotiations moved in that atmosphere."

Minneapolis-Moline lost over $5.3 million in the last two years and reported another $2.2 million loss in the first 1958 fiscal quarter, ended Jan. 31.

Financial problems led to election of a new president, J. Russell Duncan, last November.

Labor relations at M-M have generally been good. It had a six-week strike over a noneconomic issue in 1946. The only other stoppage was a wildcat strike in 1939.

About 20 per cent of M-M's employees are laid off now.

Another Example—A midwest machine tool builder has gained a year's grace from the International Association of Machinists—no wage increase in 1958. But, in return, the company will grant a 24 cents an hour wage hike in 1959: Employees will get a six-cent hourly boost each quarter.

Republic Unveils Order Process System

REPUBLIC STEEL CORP's new order processing system can place a mill order form on the mill the same day it is received at a district sales office. Previously, it took a week for an order to reach scheduling at the mill.

The "Order Service System," is based on Republic's teletype network. The machines are provided with special keyboards which allow duplication of mill order forms, shipping schedules, shipping notices, control records, and invoices.

Procedure — When orders are written, a punched paper tape is generated by the teletype machine. After the tape transmits the order to the home office service center, it is stored for use when the customer reorders the item.

As the order comes over the teletype at the service center, another tape is generated, along with a paper copy of the order form. That tape is used to transmit the order to the proper mill.

When the order hits the mill level, a third tape is generated and used to write shipping notices and the customer's invoice. In the case of all but new customers, automatic credit and traffic routing information for the order is on the master tape.

Service Centers—The system links district sales offices to centrally situated centers where customer's inquiries are answered and orders are processed and scheduled to producing mills.

Teams of specially trained men head up the service centers. On each team is a metallurgist, a sales order expert, and a mill schedule specialist. They have authority to reassign an order to the most available mill, advise the mill of unusual quality requirements, and establish production priority.

Results—The speed and efficiency of the system make possible a new single basic form for sales, order, and billing functions. It replaces 33 forms. Regardless of product, the multipurpose form supplies all necessary information and eliminates duplication and chance of error.

Research and installation of the new system was under direction of a committee headed by Edwin C. Mausz.

Concentration in Missiles?

THE NATION'S newest industry, missilemaking, is readying itself for an accusation that too much business is concentrated in too few large companies. An important watchdog, Sen. George Smathers (D., Fla.), chairman of the Government Procurement Subcommittee, has gathered facts on the relation of government furnished equipment (GFE) to contractor furnished equipment (CFE): GFE is contracted for by the government, then handed to the prime contractor for inclusion in the missile; CEF subcontracts originate with the prime.

Larger companies will contend that there are at least 40 principal contractors for about 40 missile programs: That, they think, is a much better ratio than in aircraft, where 12 companies tend to dominate the industry.

They say CFE is necessary to get the program moving fast, but that the conversion to GFE is made as rapidly as the Pentagon wants it. The number of CFE suppliers who get the same contracts after conversion to GFE will be checked into closely by Senator Smathers. Small business proponents don't think conversion helps them because only CFE suppliers gain the know-how to build the stuff. They think more equipment must originate as GFE to insure that the missile business will be spread around.

AMRI Launches Its Program

The Association of Missile & Rocket Industries, Washington, picked up the ball last week in Cleveland by inviting interested companies to tell their troubles to procurement representatives from the three services.

From the floor came such plain-spoken inquiries as: 1. Why are some large manufacturers of ground support equipment willing to take big losses on contracts? 2. What will the services do to prevent large firms from handing their subcontracting to their own divisions or subsidiaries? 3. Why is it sometimes necessary to hand-carry a firm's record of missile capabilities from office to office within a single service to convince anyone that a firm can do a job?

One manufacturer charged that a maker of ground support equipment is losing more than $3000 each on 200 units. Implication of the charge: Loss leaders in missiles are the rule rather than the exception, despite reports from the General Accounting Office of the government that such firms as Chrysler Corp. were paying too much for equipment.

FHA Help for Air Conditioning

Central air conditioning for homes is getting a big boost from the Federal Housing Administration. Commissioner Norman Mason believes the agency should "encourage" its inclusion in FHA-insured home mortgages.

Mr. Mason states his case this way: Savings on such things as cleaning, laundry, and medical expenses offset operating costs. He thinks regional FHA representatives should not consider operating costs if a home is worth more than $15,000. FHA reasons that homes without air conditioning could quickly lose value.

Small Business Tax Help Coming?

Washington sources close to the House Ways & Means Committee think some help for small firms will come this year, even if tax cuts for corporations and individuals are scuttled. On the Senate side, Sen. John Sparkman (D., Ala.) reports 35 cosponsors for a bill (S. 3194) to provide a reinvestment allowance.

A deduction from income would be allowed for increased investment in inventory or depreciable assets. Fifty per cent would be allowed on the first $10,000 of eligible investment; 30 per cent on the second $10,000; 20 per cent on the third $10,000.

Other provisions include deduction for money invested in retirement plans, installment paying of estate taxes, and extended depreciation allowances on used equipment.

School Construction May Come Yet

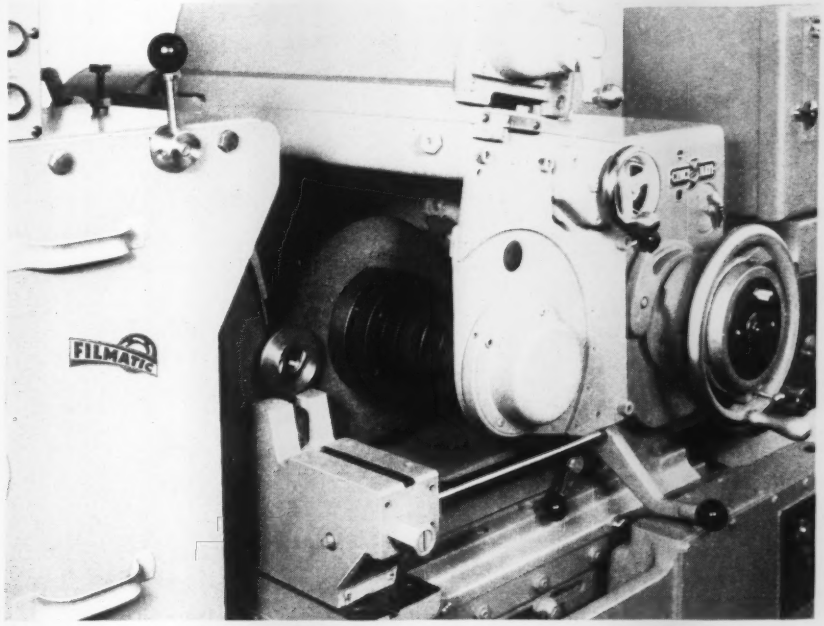
Why hasn't the administration come forth with a program for school construction to combat the recession? The question is dominating inner circle conversations this week in Washington. Rumor has it that a program will be offered later in the year if the recession isn't over by then, but the school folks can't figure the President's apparent radical change of heart since last year's budget message.

Best guess for the new attitude is a decision to play along with states' rights advocates in the hope that the Republican party can shed its "too liberal" reputation gathered during the Eisenhower administration.

FTC Consent Decrees Examined

The House Antitrust Subcommittee wants to know if antitrust violators are getting away with something via consent decrees with the Federal Trade Commission. Under investigation is the decree signed with Western Electric Co. Inc. and American Telephone & Telegraph Co. two years ago. The point, says a committee spokesman: The consent decree didn't cover any of the charges against Western Electric and AT&T originally made by the government.

FTC reports it is cleaning up its case load these days so violators of antitrust laws obtain quick judgment, but the House committee believes too many cases are called off via the consent route. In 1957, of 204 orders issued by FTC, 156 were consent decrees.



Several automatic features incorporated in this CINCINNATI FILMATIC No. 2 Centerless Grinder reduce nonproductive time in centerless grinding two diameters on turbine shafts.

Automatic Grinding Cycle Incorporates Wheel Truing

. . . on this Cincinnati Centerless

Give the operator an assist with nonproductive chores and he'll accomplish more. One way to do it is to *automate* as many nonproductive elements as possible in the cost of machining. Cincinnati grinding specialists proceeded along these lines in equipping a CINCINNATI® FILMATIC No. 2 Centerless to grind two diameters on turbine shafts. Automatic features for reducing nonproductive time include:

Automatic profile truing for grinding wheel, including cycle counter

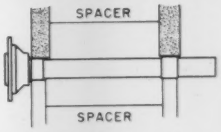
Automatic grinding wheel balancing

Automatic grinding wheel reciprocating, with truing interlock

Automatic Electro-Hydraulic Infeed

These cost-reducing features are in addition to well-known Cincinnati advantages such as bed rock mounting of grinding wheel spindle; FILMATIC grinding wheel spindle bearings; double slide support for the regulating wheel unit. Cincinnati is unquestionably the best buy for your precision centerless grinding work. Get additional details by asking for catalog No. G-644-3, or look in Sweet's Machine Tool File for brief specifications.

CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO



Drawing of part showing diameters ground.

Production Data:

Part name	Turbine shaft
Material	Steel
Stock removal	.010"
Production	150 parts per hour

CINCINNATI®

CENTERTYPE GRINDING MACHINES • MICRO-CENTRIC GRINDING MACHINES
CENTERLESS GRINDING MACHINES • ROLL GRINDING MACHINES • SURFACE
GRINDING MACHINES • CHUCKING GRINDERS • CENTERLESS LAPPING MACHINES

plan with COPPER

Time and again, engineers and designers plan with Copper and its alloys when there's a tough job to be done. For instance, the American railroads, in an effort to eliminate crippling "hot boxes" have been experiencing great success with a new self-lubricating cartridge-type journal bearing. Each of these bearings contains 75 pounds of bronze . . . a Copper alloy.

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These new cartridge bearings, produced by the American Brake Shoe Company are proving to stand up to great impact, require very little maintenance, provide long life and greatly minimize the chance of "hot boxes" . . . thus effecting great economies for the railroads.

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The next time *you're* faced with a challenging problem, *think first of Copper!* For Copper has distinctive qualities you'll find in no other metal. It resists corrosion, is unexcelled as a commercial heat transfer agent, is the best commercial conductor of electricity. In addition, Copper and its alloys are easy to work, form, draw, join, stamp, polish and plate. And there's an ample supply to meet all of your current and future needs.

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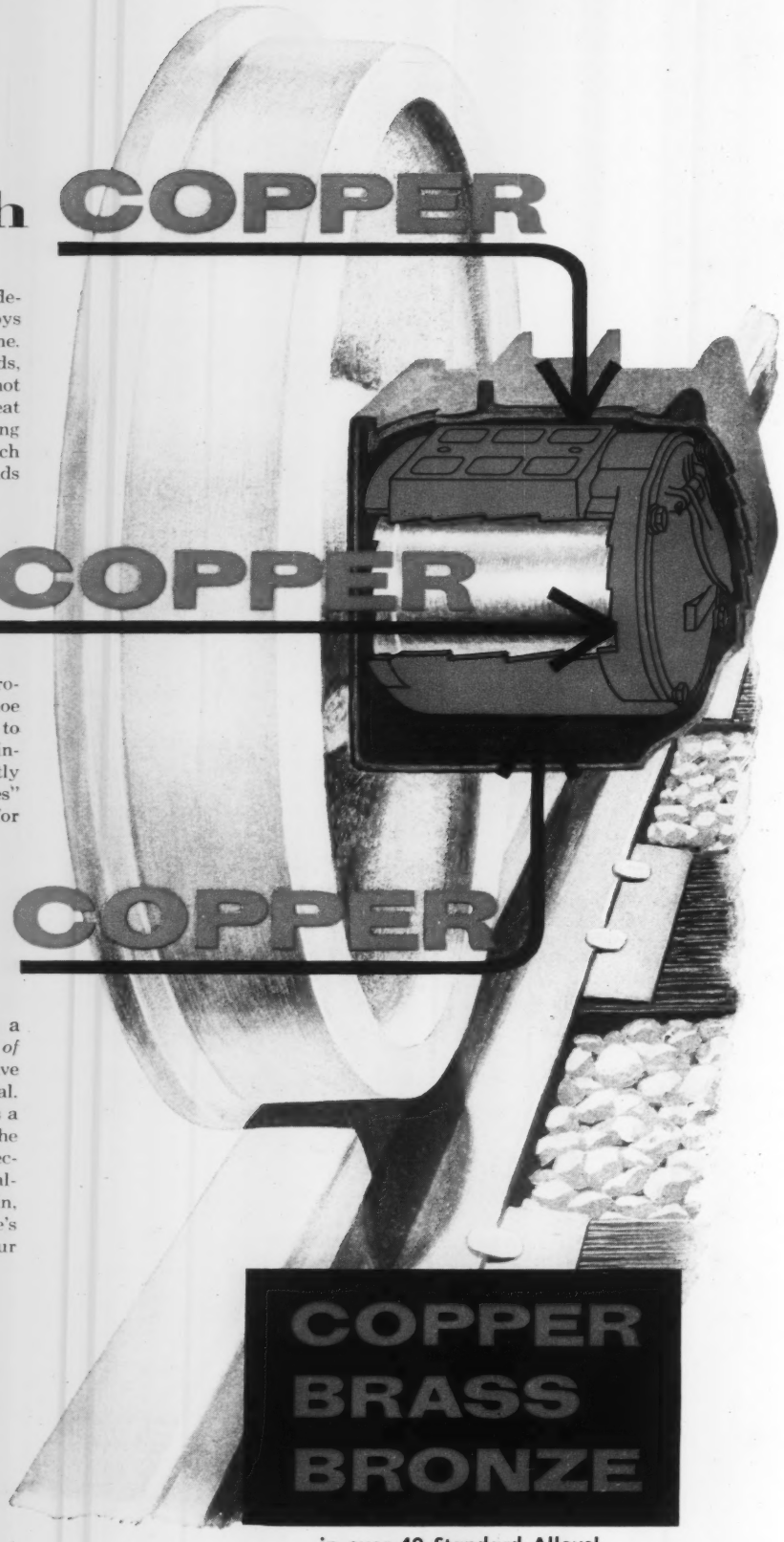

COPPER
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in over 40 Standard Alloys!

PANEL MEMBERS, left to right. . .

T. L. STRIMPLE, president National Acme Co.
E. L. SPENCER, vice president-general manager, Fairmount Tool & Forging Inc.
HOWARD WILLIAMS, director of purchasing, Eaton Mfg. Co.
JOHN S. MORGAN, associate managing editor, STEEL.
GEORGE E. WILLIS, superintendent Electrode Div., Lincoln Electric Co.
WILLIAM I. ONG, assistant to the president, American Steel & Wire Div., U. S. Steel Corp.
WALTER J. CAMPBELL, editor, STEEL.
ROBERT F. HUBER, machine tool editor, STEEL.
HOWARD GEYER, director of quality control, Warner & Swasey Co.
WILLIAM BENNINGHOFF, vice president-general manager, Tocco Div., Ohio Crankshaft Co.
RUSSELL L. SMITH, superintendent Brush Div., Osborn Mfg. Co.
HENRY SPITZHOFF, vice president Robert Heller & Associates
C. P. MCCABE, assistant vice president-operations, Republic Steel Corp.

How To Sell Ideas to Bosses

They're looking for ways to boost efficiency. Their managers in production, engineering, and purchasing often have ideas but can't sell them. Here are clues to a solution

JOE JONES, production manager for Technoprint Co., has figured how a new handling unit can lower his shop's unit production costs. The handling unit will cost $18,000 installed. It will save the company $12,000 the first year. Joe has figured carefully. He knows his figures are right. He knows the company can't afford not to buy the new unit. But he just doesn't know how to sell his idea to Mr. Black, Technoprint's president.

Joe feels frustrated. His company fails to profit from a solid idea.

STEEL's editors have turned up many such incidents in the pursuance of its Cost Crisis campaign. Selling ideas to management is one of the great bugaboos confronting middle management in metalworking plants everywhere.

Wanted: A Solution—How do you sell ideas to top management? The editors of STEEL presented the question to a panel of ten Cleveland metalworking executives in a brainstorming session (see photo).

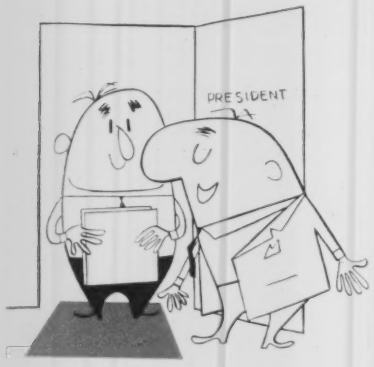
The ten brainstormers, representing various levels of management, agree that the problem is universal. They realize it causes widespread frustration among the managers in the lower echelons and is expensive because companies are losing cost-saving opportunities through imperfect communications.

Money for Equipment—Top management has tightened its purse strings during the current recession, but the brainstormers are confident that most companies are able and willing to spend money for new capital equipment when it is demonstrated that the equipment will lower unit production costs sufficiently to pay for itself within a reasonable period.

They offer advice on four aspects of selling ideas to top management: 1. Creating the climate. 2. Prepar-

COST CRISIS COMPETITION

This article is part of a campaign to help industry achieve lower unit production costs. The editors of STEEL are searching for companies that have brought about important cost savings through more efficient use of capital equipment. Does your company qualify? If so, enter the Cost Crisis Competition. Write to the Cost Crisis Editor, STEEL, Penton Bldg., Cleveland 13, Ohio, for your awards kit. An extra copy of this article is available until supply is exhausted. Write to Editorial Service, STEEL.



Creating the Climate

1. Top management must make known its eagerness to receive ideas from secondary levels of management and supervision.
2. Management must establish procedures by which ideas can be passed upward. It may specify when certain links in the chain of command may be bypassed. Emphasize the president's door is always open.
3. Management should make the company's needs known to encourage the search for ideas that are consonant with the over-all plan.
4. Communication is a two-way street. Management must listen to ideas, then play back to the originator the disposition—and why.
5. A capital spending forecast should be drawn up periodically and made known to the various levels of management and supervision. It will enable them to improve timing and keep suggestions in line with what can be spent.
6. Beyond planned expenditures, management should emphasize that it will spend more if the exceptional idea merits it. Keep looking for ideas to lower unit costs all through the year, not just at appropriation time. The exceptional idea may be one you can't ignore.

Preparing the Case

1. Be careful of your timing. Don't try to sell management on ways to lower the costs of making toasters if the company is going out of the toaster business.
2. Begin with the idea. Be sure it is clearly presented.
3. State its benefits to your company. Enumerate the benefits one by one. Don't overstate your argument.
4. Make certain your proposal to top management offers an attractive return on cost. Many companies veto ideas that can't be written off in three years or less.
5. Get facts and figures to support your case. A little mathematics is worth a lot of words.
6. If assumptions must be made, identify them as such. The fewer assumptions and the more facts you can muster, the greater are your chances for success.
7. Organize supporting material.
8. Anticipate objections to the idea. Be prepared to answer as many as possible.

ing the case for the idea. 3. Presenting idea. 4. Clearing the channels for idea transmission from the originators to top management (see checklists above).

Boss's Job — Responsibility for creating a climate that permits ideas to flow upward belongs to top management, the panel says. The boss has to make clear that he expects middle managers to come up with ideas, that he will listen to them, and will let the originator know what decision is reached.

Several panel members noted they get many more ideas than they can accept. Management's problem is to select the best.

The originator's problem is to present his idea in the most effective manner possible.

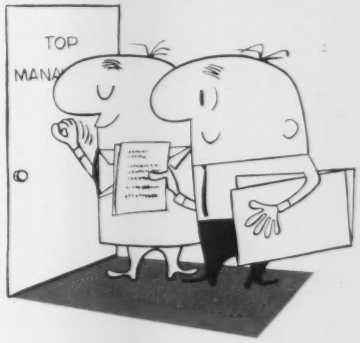
Favored suggestion for finding the most outstanding ideas: Let an idea-evaluating group study the proposals.

Consensus for idea submitters: Make it simple; make it mathematical; and present it with conviction.

No Fortitude?—Middle management often is too timid, too easily discouraged, charge the panelists. "Put more guts in your presentation," advises one. Top manage-

Presenting the Case

1. Enlist aid from your associates. Your advertising department can help with charts and graphics. Research may have facts and figures you need. Sales can give tips on merchandising the idea.
2. Try out your presentation on your associates. Listen to their comments. Don't argue. Talking it over will uncover flaws, suggest ways to improve.
3. State your case simply. Simplicity begets clarity.
4. Use charts and graphics if they will help to communicate your ideas quicker and with greater clarity.
5. If presentation is written, emphasize the salient points in headlines. Underscore them.
6. If you believe in your idea, have the guts to fight for it. Gamble a little.
7. After presenting the case, briefly summarize costs, benefits, potential benefits. Make your recommendation. Don't forget to ask for the sale.



Clearing the Channels

1. Top management has the primary responsibility to keep open the channels of communication between the originators of ideas and those empowered to act upon them. If the channels get clogged, many cost reducing ideas will never bear profit fruits.
2. Top management should let its secondary level of management and supervision know that it expects them to develop ideas to lower unit production costs and to increase efficiency.
3. If an intermediate boss wants to hog the credit for a subordinate's ideas and if management has not opened direct channels, the subordinate manager may be wise to let the credit go to his superior a few times. Eventually, truth will out.
4. If an intermediate boss bars communication between subordinates and top management, the obstructionist should be bypassed.
5. If the intermediate persists in clogging the channels, he may have to be fired.
6. Usually, a suggestion system offers an effective way of getting around obstructionists. Ideas are fed into a screening committee, then to top management.

ment men on the panel recognize that production supervisors, engineering managers, and purchasing directors often are not skilled in selling, often fear they are inarticulate.

Obstructionists — Another problem, which the panel found difficult, is how to deal with the intermediate boss who persists in either hogging the credit for subordinates' ideas or in blocking them off from communication with the top boss.

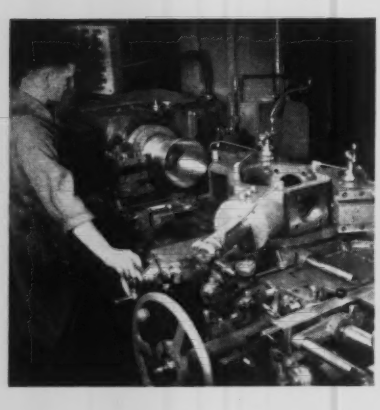
They agree it's top management's job to handle this individual and to clear channels around him. If he persists, the only cure may be to fire him. "But even these guys may perform valuable functions. You can't fire them all."

The Major Task—Top management's chief responsibility, the brainstormers believe, is to ferret out good ideas. "Your middle managers," says one executive, "should all know your sales prospects, your capital spending budget, long-range plans, and anything else affecting new ideas."

In short, good communications are central to the problem of how to sell ideas. The secret weapon: No secrets.

(Advertisement)

letters from production men . . .



Cost Savings: 47%

For maximum production at reduced costs, the taper attachment on a 7A Jones & Lamson Turret Lathe has proved to be invaluable. Our type of manufacturing is mostly of a small quantity, job-shop nature, but we do manufacture large quantities of tapered sleeves.

The original method for producing these sleeves called for a bar-feed turret lathe to rough out the blanks with an engine lathe being used to finish bore and ream the internal taper and turn the external taper.

Our present method specifies boring and turning both tapers on a 7A Jones & Lamson Turret Lathe with no subsequent engine lathe operation. This results in a cost savings of approximately 47%.

The old method resulted in double handling, high cost, and wasted floor space. The new method, using the Jones & Lamson taper attachment, assures accurate, concentric tapers at a minimum cost.

— Planning Engineer —

Little things paid off

Of course J & L turret lathes have all the major requirements of a good machine tool — Rigidity, Power, Accuracy; but I believe their superiority is due to the little things that pay off in production, such as the J & L feature: "Automatic Internal Delivery of Coolant to Each Turret Position".

Here is how this feature paid off in the chasing of 1" – 8" Class II threads on long forged and heat treated stress rods and bolts. On other equipment these parts were threaded at 23 R.P.M., with a tool life of about 4 hours. Thus, two tool changes were required per shift. When the job was shifted to a J & L turret lathe it was possible to pipe the coolant directly into the die head, so that the coolant intimately flooded all cutting edges and carried both the heat and chips away from the cutting area. This permitted a 350% increase in cutting speed, and with only one tool change required every 2½ shifts. This resulted in a real cost reduction, and the increased speed produced a superior finish on the threads.

— Production Supt. —

Accuracy improves 60%

The Jones & Lamson No. 3 Universal Ram Type Turret Lathe with spindle speeds up to 1500 R.P.M. enables us to use high velocity turning with carbide tools, which we feel is a big factor in the reduction of cost per piece manufactured. Also the single lever carriage and turret feed selector have been big factors in reducing machine time. The rigidity of this machine helps us attain tolerances of .0005", which must be held in the work we constantly perform on these machines. Since the installation of six of this type of machine our production and quality of work has improved about 60 to 70%.

— Machinist —

Saved $30 per part

Our new J & L 10B Turret Lathe, with its cross slide and power indexing turret with multiple stop stations, will save us $30.00 per part, or 50% of present cost over any other available machining method.

— Director of Purchasing —

Saved $40,000 a year

The #5 Jones & Lamson Turret Lathe with Hydraulic Tracing Attachment has given us quality, production, and savings on contour machining of Stainless Steel Forgings.

This contour was originally rough machined, then traced in separate operations.

With the improved method, the Jones & Lamson Hydraulic Tracing Attachment is mounted on the back slide, leaving the front slide free to use the square and hex turrets for rough machining.

These parts are now rough and finished machined in one operation, saving $40,000 per year.

The work piece is located on a face plate fixture weighing 80 lbs. and traced with a carbide tool at a spindle speed of 1040 R.P.M. and a feed rate of .00125 I.P.R.

The 30 micro inch finish and .001 of an inch tolerance required on this contour is maintained only because of the rugged construction and built-in accuracy, characteristic in all Jones & Lamson products.

— Methods Engineer —

Never had a failure

The No. 5-3 Turret Lathe is the only Jones & Lamson machine in our shop. I wish we had more of its kind.

This lathe is most suitable for our type of production, which consists of small series, because it can be set up quickly. We treasure this machine for its accuracy in small and big work.

The "Single Lever Speed Selector" and the "Hydraulic Collet Chuck" are features which are highly appreciated by the operators.

But the appraisal would be incomplete without giving credit to its outstanding ruggedness.

We have run this machine for the past two years at 24 hours a day on a six-day week and never had a failure.

— Tool Designer —

Production increased 4 to 1

The Hydraulic Tracing Attachment which we are using on a No. 5 J & L Ram type Turret Lathe has proved to be the most useful to me as Shop Superintendent. Production has increased four to one since installation of the attachment three years ago. The accuracy of the parts made on the above machine determines the final performance of our product. Before using the Hydraulic Tracer our rejects were high and production was low. The success of the tracing attachment relieved us of one of our major manufacturing problems.

The work performed has to be held to close tolerance. It is the final contouring of Valve Plugs in all grades of stainless steel and hardfaced or heat treated metal. Combined with Masters made from our stock parts and carbide tooling, the cost of templates and tools is comparatively low. The combination of a turret lathe and tracer control also simplifies our setups and results in reduced cost. In fact, the setup time we save by use of masters accounts for fifty percent of our savings.

— Plant Supt. —

Consistent on plunge cuts to ±.002

Our J & L #3 Universal Turret Lathe, once it is set up, constantly repeats on plunge cuts to a ±.002 and on regular forming cuts holds to ±.001 between centers.

This feature allowed us to eliminate a grinding operation, on an ordnance contract part, at a considerable saving. Said part being a steel casting pintle wt. 13# shank end.

We are at present using the lathe for our regular production of conduit fittings and parts, and the knowledge that accuracy is a known factor is quite a morale builder to both management and production.

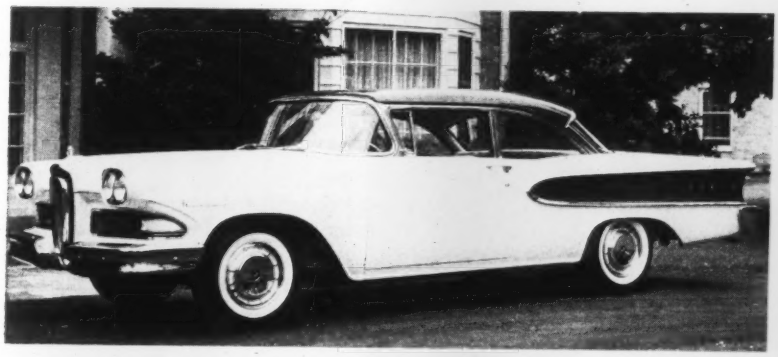
It is surprising how much respect can be gained between management and production in the use of such equipment, and the satisfaction the production worker is given when he knows he can depend on consistent performance of his equipment.

— Plant Engineer —

(names of these customers available on request)

. . . to Jones & Lamson Machine Company

517 CLINTON ST., SPRINGFIELD, VT.



Ranger-Pacer models will stay . . .

Corsair-Citation jobs will go as...

Ford Calls Time on Edsel

EDSEL has 90 days to produce or its sales and dealer organization will be washed out, say Ford middle management people close to the situation.

It doesn't mean the line will be junked. But it would be absorbed by either Ford or Mercury dealers, depending on which group needs the sales appeal an extra car may offer. Many Edsel dealers will have a chance to switch over to Ford or Mercury.

Background—Looking back over Edsel's brief history (it was introduced last September), these seem to be the facts that have made Ford management put it on the spot:

Originally, Edsel was shooting for 200,000 sales in its first year. That averages out to about 650 sales per working day. Shortly after the first of the year, the company realized the 1958 market couldn't absorb that many cars, and it lowered its sights to 120,000 units (400 cars per day).

At that time, the Edsel Div. had some 1200 active dealers and prospects of signing on more. It also had 24 district sales offices (each staffed by about 18 men) to service and distribute cars to dealers.

Slide Starts—Since the first of the year, sales have steadily gone down. They are now running about 72 per day, say company sources.

The 24 district sales offices have been cut to 14; in the remaining, a 40 per cent cut has been made in personnel. Only one staffman remains in each of ten field offices that have been trimmed back.

In addition, Edsel has been absorbed into the recently formed Mercury - Edsel - Lincoln (M-E-L) Div., and about half the Edsel crew that started the year has left.

Dealers Dropping—Edsel's 1200 dealers are still active—on paper. The company is holding the contracts open on these dealerships, say STEEL's informants. Actually, more than 200 of the dealers have closed their doors. It is believed that less than 1000 are in operation.

Edsel's only producing plant is the one in Louisville. Occasionally, Corsairs and Citations are built at Ford's Wayne, Mich., facility. Edsel started model buildups at a 4000 to 5000 weekly rate late last summer. By December, the pace had dropped to less than 1000 a week; more recently, production has been running between 300 and 400 every other week.

Sales Reports—Edsel reportedly has built about 58,000 cars and has sold 40,000, although some 1800 to 2000 are registered in Ford Motor Co.'s name.

Edsel dealers have an inventory of roughly 18,000 cars. Company sources indicate dealers will have to sell 200 cars daily to work off these stocks by the time the deadline runs out. Current production is expected to be enough to keep stocks from sliding to zero.

Time's Up—By the end of June, Ford management will know whether it will have to scrap Edsel's marketing setup or whether the "E" car still can be sold as a separate line.

Some talk has it that Robert S. McNamara, group vice president in charge of the company's car and truck division, wanted to junk the whole program much earlier, but it was kept alive through the efforts of James J. Nance, head of the M-E-L Div. Insiders suggest it may be a victory for Mr. Nance

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FORD'S GERMAN-BUILT TAUNUS will go on sale in the U.S. next month. Built on a 102.5 in. wheelbase with a 172.2 in. over-all length, it's 57.7 in. high, 65.7 in. wide, and carries five passengers. It's powered by a 4 cylinder, 67 hp engine with 103.6 cu in. displacement and a 7.1:1 compression ratio. Test runs indicate the car averages 35.3 mpg; cruising speed is 78 mph. Six models will be offered

if Edsel retains its own marketing group. If it has to be absorbed into other product lines, it may be a point in Mr. McNamara's favor (see STEEL, Mar. 17, p. 57).

Changes Ahead—No matter what happens, Edsel won't keep the four models it started with. The top priced Corsair and Citation jobs will be gone next year. Ranger and Pacer models will be built on separate wheelbases, but with a single body for both cars. (The Pacer will presumably have an extended body.)

Edsel already has said it will continue the same basic styling theme for 1959. This means the oval grille will be retained. So will the rear lights, although they'll be placed below the rear deck lid so Edsel can utilize Ford quarter panels.

Edsel will offer three engines, ranging from 300 down to around 190 hp in an effort to play up fuel economy. The E-475 engine, introduced in the Corsair and Citation cars, will be gone.

Long Look Forward—Economic conditions may explain Edsel's sad start. Little blame for timing can be attached to the company. Committed several years in advance, it couldn't pull back when signs of a downturn started to appear.

Hindsight indicates Ford might have done better if it had brought out the Edsel as Mercury was in 1938. It was turned over to Ford dealers who were told, in effect, to see what they could do with the car. Over the years, Mercury grew until it gained the status of a separate product line.

Supposedly, this was the course Mr. McNamara wanted for Edsel. Now he may have his chance. In time, Edsel may regain its strength and be capable of standing on its own four wheels.

Members Nick UAW

Negotiations between the UAW and Ford Motor Co., General Motors Corp., and Chrysler Corp. have been going quietly and on schedule. Fireworks aren't expected for at least a month. Currently, all parties are looking over demands which have been presented.

Chrysler is expecting trouble with its job transfer clauses. Ford and GM are in for plenty of talk about profit sharing, but the real hammering will come on productivity standards (STEEL, Mar. 31, p. 49).

The UAW also faces trouble within its ranks. UAW headquarters was picketed ten days ago by members of Local 1284 (Chrysler MoPar) who protested being bumped from their jobs when Chrysler moved some of its operations from Detroit to Marysville, Mich.

While the UAW International hurriedly set up a grievance committee to listen to the seniority gripes of the members, two AFL-CIO unions joined last week in an effort to recruit more skilled workers from the UAW.

The Pattern Makers League of America and the International Union of Operating Engineers have filed petitions with the NLRB asking for representation elections at Ford's Livonia, Mich., transmission plant, GM's Fisher Body Plant No. 1, Flint, Mich., Chevrolet's experimental engineering department, and the Truck & Coach Div., Pontiac, Mich.

The NLRB also has received a petition asking decertification for 31 tool and die workers at the Oldsmobile plant in Lansing, Mich. All told, an estimated 3500 skilled workers are involved, says Thomas Roumell, regional NLRB director. He adds that first hearings on the Ford petitions will be held this week.

That makes four skilled trades groups bent on taking a bite out of UAW memberships. The Society of Skilled Trades and the American Federation of Skilled Crafts earlier filed about 30 petitions with the NLRB.

Although the petitions could complicate UAW negotiations with the Big Three, it looks like auto contracts can be signed anyway by including a clause which will leave the way open for special settlements if the skilled trades groups succeed in their efforts.

U. S. Auto Output

Passenger Only

	1958	1957
January	489,357	641,591
February	392,112	571,098
March	360,000†	578,826
3 Mo. Total	1,241,469	1,791,515
April		549,239
May		531,365
June		500,271
July		495,629
August		524,354
September		284,265
October		327,362
November		578,601
December		534,714
Total		6,117,315

Week Ended	1958	1957
Mar. 1	91,508	140,362
Mar. 8	83,892	140,161
Mar. 15	86,447	141,038
Mar. 22	80,560	138,646
Mar. 29	92,482†	130,233
Apr. 5	83,000*	130,318

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

Salt bath heat treating helps put you in a better competitive situation!

The Ajax files are full of case history records such as these. Each represents a typical instance where replacement of other heat treating systems with Ajax Salt Baths have meant important cost reductions or greatly improved quality—*and usually both:*

$37,000 WAS SAVED in 8-months by an Ohio manufacturer through using an Ajax Electric Salt Bath installation for 4 different cost-cutting operations i.e. carburizing, simultaneous carburizing and brazing; brazing; and hardening.

A 350% PRODUCTION INCREASE in 45% less space with 50% less labor was achieved in carburizing bearing races in a 6-unit Ajax Electric Salt Bath installation.

A 60% COST REDUCTION in case hardening body screws was scored by a single Ajax Salt Bath no larger than your desk but handling 390 lbs. of work per hour.

AN 80% REDUCTION in finish grinding time was obtained by martempering SAE-52100 bearing races in an Ajax installation. Drawn to Rc 62-63, the races showed average out-of-round distortion of only 0.002-0.003".

A 4 TO 5 TIME LIFE INCREASE for rock bits resulted from Ajax Salt Bath hardening which also made possible use of plain carbon rather than costly alloy steel. 480 lbs. of work per hour are handled in a bath only 36" x 11" x 36".

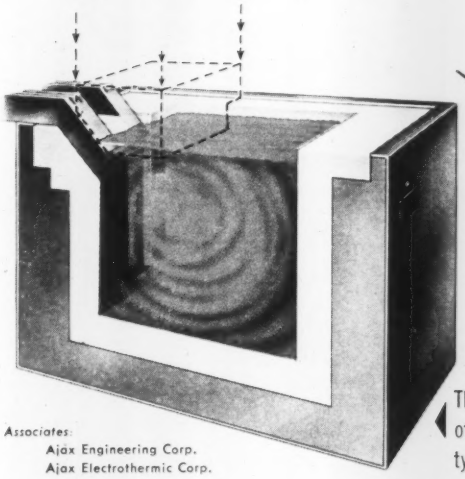
SIMULTANEOUS CARBURIZING AND BRAZING of a complicated motor starting assembly are done in one Ajax furnace with one heating of the work as compared to two heatings previously required.

Savings like these are vitally important—and Ajax can help you to realize them to the fullest extent.

The chief product of Ajax is applied heat treating "know how" . . . not merely the largest assortment of salt bath furnace types in the world. When you discuss heat treating matters with Ajax, you get full benefit of unmatched experience not alone in designing and selling furnaces, but in helping you utilize them to best possible advantage.

There is no obligation in having Ajax make a frank appraisal of your heat treating situation.

AJAX ELECTRIC COMPANY
952 Frankford Avenue
Philadelphia 23, Pa.

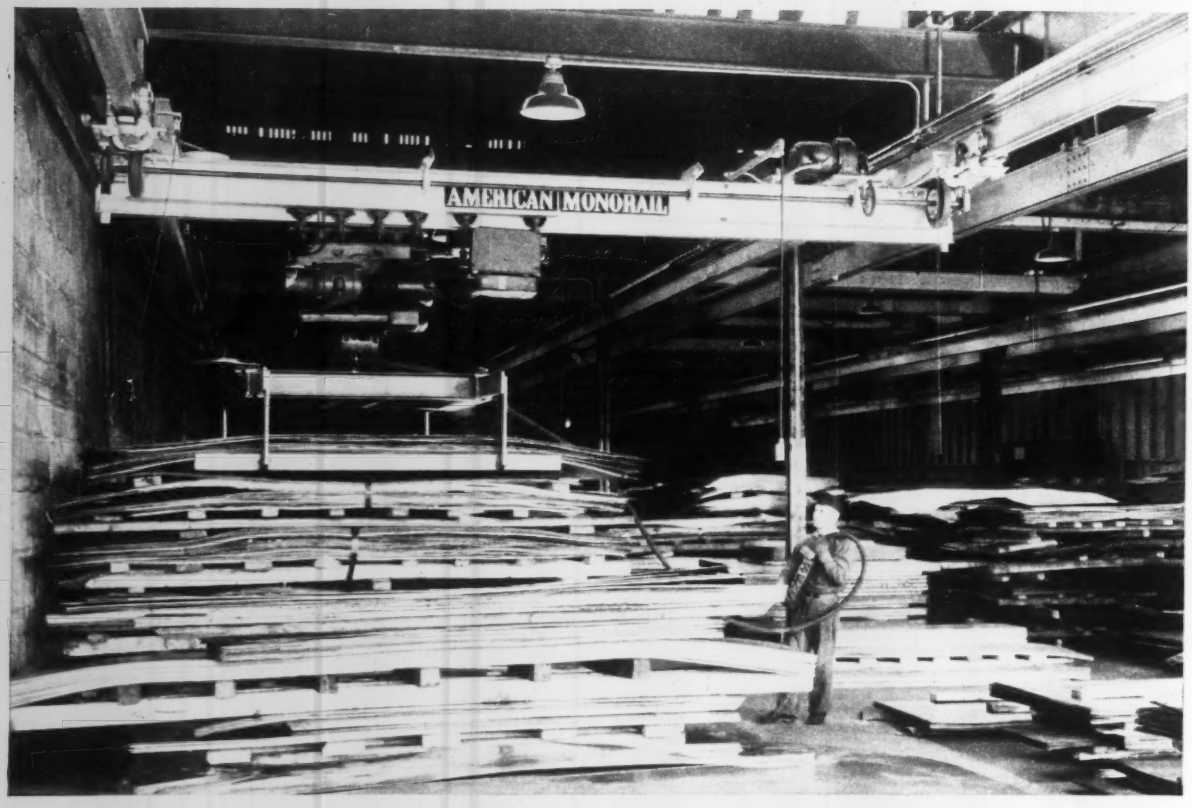


Associates:
Ajax Engineering Corp.
Ajax Electrothermic Corp.

AJAX
HULTGREN
SALT BATH FURNACES
Internally heated. Electric and gas fired types.

The most efficient heat treating principle for a wide variety of work . . . Pioneered by Ajax in the largest line of furnace types, shapes and sizes for modern production requirements.

PIONEERS IN SALT BATH HEAT TREATING PROGRESS



Reduce "*Manufacturing Overhead*" ...by Going Overhead with AMERICAN MONORAIL

R *educe indirect mfg. costs*
E *liminate re-handling*
D *amage to floors eliminated*
U *tilize larger production units*
C *ontrol work flow*
E *xpedite production*

M *inimize employee fatigue*
F *ull use of plant cubage*
G *ain full use of floor space*

C *ut "down time"*
O *vercome floor hindrance*
S *ecure flexibility in material movement*
T *ransfer loads without re-handling*
S *afety for the employee*

An American MonoRail system will bring a quick reduction in manufacturing costs because it can do all the things listed at the left.

Overhead handling puts your ceiling space to work—leaves your floor free of traffic—helps you produce more efficiently in less space.

American MonoRail engineering consultants are available without obligation for the solution of your handling problems.

Write for Bulletin C-1 illustrating hundreds of successful MonoRail installations.

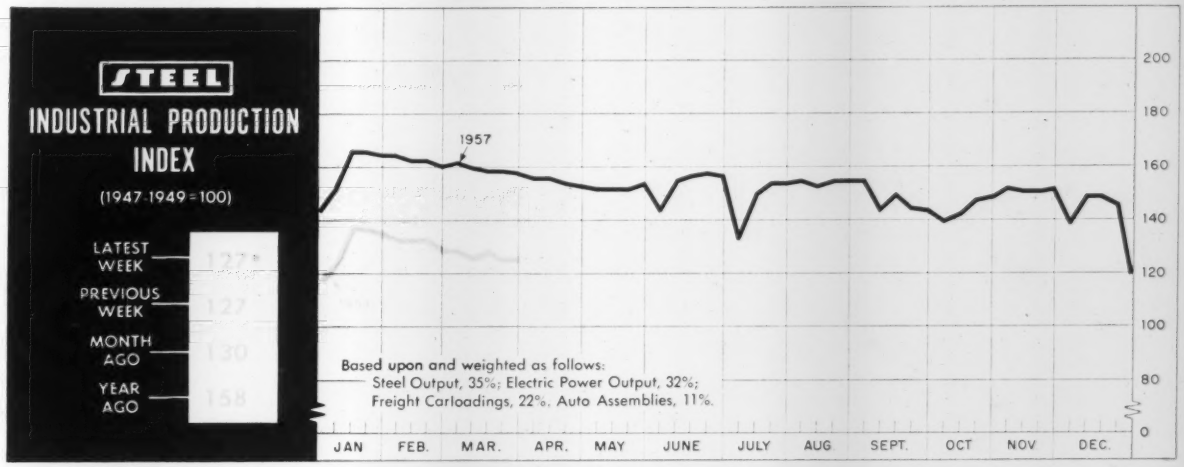
AMERICAN MONORAIL

ENGINEERED MATERIALS HANDLING

13102 ATHENS AVENUE
CLEVELAND 7, OHIO

OVERHEAD HANDLING EQUIPMENT

MEMBER OF MATERIAL HANDLING INSTITUTE AND MONORAIL MANUFACTURERS ASSOCIATION



*Week ended Mar. 29.

Purchasing Agents See End of Downtrend

THE NATION'S purchasing agents confirm a belief expressed in this column for several weeks: The recession is losing its downward momentum, but business will remain dull for some time.

Members participating in the monthly survey of the National Association of Purchasing Agents in late March stated that new orders maintained the improvement shown in February. Two-thirds of the respondents replied that orders were equal to or better than they were a month prior. Production shows signs of ending its downtrend, too. Only 30 per cent indicated a further slackening off, compared with 45 per cent in that category in February.

No. 1 Problem—Despite the more encouraging tone of business, the drive to liquidate inventories goes on; levels now approach those of mid-1954, NAPA reports. Members state that so long as materials are in free supply, they will pare stocks to the bone. Almost half the reporting agents have cut inventories in the past month; only 12 per cent have increased shelf purchases.

Business confidence remains high, as evidenced by the stability of plans for capital expenditures. Sixty-two per cent indicate that their budgets made up last fall are still intact, while only 29 per cent have made any cuts. Nine per cent have even boosted their spending plans.

Metalworking's Mirror—In Cleveland, which often reflects conditions throughout metalworking, purchasing agents say conditions are a shade better than they were a month ago. Their report illustrates the uneven character of this recession. Some members of the Purchasing Agents Association of Cleveland are still working five days a week. Others are on a short week. Inventory liquidation is going on at a faster pace than it is nationally. A hefty 93 per cent of reporting members held to prior levels or cut back more in March.

Parts Leveling—Producers of com-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,298[1]	1,366	2,319
Electric Power Distributed (million kw-hr)	11,750[1]	11,756	11,694
Bituminous Coal Output (1000 tons)	7,445[1]	7,550	10,355
Crude Oil Production (daily avg—1000 bbl)	6,250[1]	6,263	7,786
Construction Volume (*ENR*—millions)	$441.9	$278.3	$359.0
Auto, Truck Output, U. S., Canada (*Ward's*)	118,668[1]	104,928	164,150
TRADE			
Freight Carloadings (1000 cars)	525[1]	533	695
Business Failures (Dun & Bradstreet)	357	336	318
Currency in Circulation (millions)[3]	$30,524	$30,592	$30,502
Dept. Store Sales (changes from year ago)[3]	−4%	−1%	+1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22,359	$25,951	$22,541
Federal Gross Debt (billions)	$273.0	$275.4	$272.0
Bond Volume, NYSE (millions)	$21.6	$20.7	$17.7
Stocks Sales, NYSE (thousands of shares)	10,856	11,316	8,549
Loans and Investments (billions)[4]	$90.5	$89.4	$86.7
U. S. Govt. Obligations Held (billions)[4]	$28.3	$28.0	$26.0
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	227.41
STEEL's Nonferrous Metal Price Index[6]	199.1	201.4	239.3
All Commodities[7]	119.8	119.6	117.0
Commodities Other than Farm & Foods[7]	125.9	125.9	125.3

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1958, 2,699,173; 1957, 2,559,490. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

Design Analysis On Fasteners and Small Parts

Shows Cold Heading Usually Cuts Costs

This may very well be the age of "Design Analysis". And, one of the most promising fields for such a cost saving study is fasteners and small parts. Actually one of the most important cost cutting developments in recent years is the increasing use of cold headed parts and fasteners in place of more expensive and structurally weaker screw machine products.

The more expensive bar stock used in the screw machine method results in considerable waste, whereas the waste is almost negligible in cold heading.

Another important consideration is the greater strength structure of parts made by the cold heading method. The blow of the heading tool causes the grain structure of the metal to flow in lines of greater strength.

The possibilities of cold heading are almost unlimited when used in conjunction with secondary operations. The tremendous savings in operation and material costs make it a must consideration when designing small parts either as fasteners or as integral units for manufactured parts. It has been a long time policy of John Hassall, Inc. to support their cold heading equipment with the latest methods of secondary manufacture. Machines for roll threading, slotting, drilling, tapping and many other operations are available for your profit.

Given complete specifications, including a drawing and an idea of the application, we can quickly tell you whether or not it will be advantageous to have your fastener or part JOB-DESIGNED by HASSALL. The remaining important aspect of our service to you is the ability to get into production quickly and make prompt shipment.

Write today for your copy of our new Catalog No. 106.

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Manufacturers Since 1850
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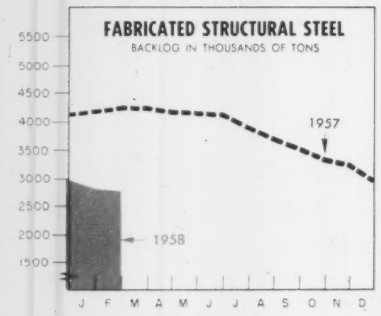
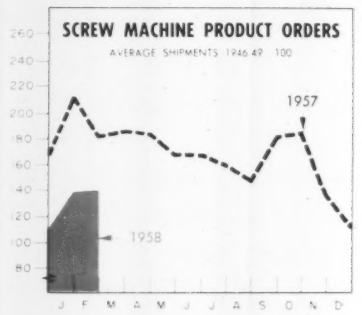
THE BUSINESS TREND



	Shipments		Backlogs	
	1958	1957	1958	1957
Jan.	316.7	290.1	2.778	4,194
Feb.	282.6	319.0	2.727	4,262
Mar.		342.4		4,245
Apr.		362.2		4,192
May		377.3		4,172
June		384.7		4,134
July		342.5		3,907
Aug.		383.8		3,707
Sept.		338.6		3,521
Oct.		384.8		3,322
Nov.		334.1		3,233
Dec.		320.2		2,959
Total		4,179.7		

American Institute of Steel Construction. Charts copyright, 1958, STEEL.



	New Orders		Shipments	
	1958	1957	1958	1957
Jan.	138	211	165	206
Feb.	139	181	140	185
Mar.		185		197
Apr.		183		193
May		167		192
June		166		173
July		159		139
Aug.		147		173
Sept.		181		168
Oct.		184		184
Nov.		135		159
Dec.		110		144
Avg		167		176

National Screw Machine Products Assn.

ponents informed STEEL this week that their inventories are finally reaching the desired level (see Page 137) and that they see the end to this particular adjustment.

Employment Firms Up

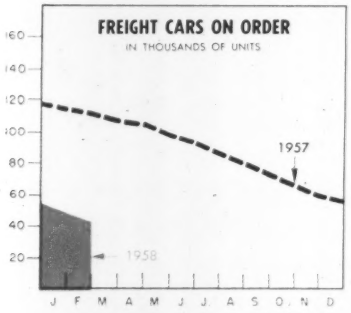
One of the most significant results of the bottoming out is the improvement in employment although the Department of Commerce figures for March (due next week), may leave some doubt. Many observers feel that a great portion of the expected increase can be attributed to the last two weeks of February. Stability began to appear during the first half of last month, they argue.

This was one of the most persistent patterns in the spot surveys of the component and capital goods industries conducted by STEEL last month. (See Mar. 24, p. 61, and Mar. 31, p. 47.) Those anticipating layoffs indicated they would be minor. Such reports were offset by renewed hiring or lengthening of workweeks.

The purchasing agents, in the reports mentioned above, feel that unemployment is leveling off. The Cleveland group declares that the "trend toward less employment each month, for the last four months, has halted." The national association qualifies its conclusion by tying any future improvement to successful negotiation (without strikes) of the many important labor contracts that are up for renewal.

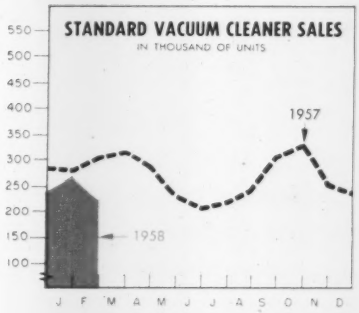
One of the weakest segments of the employment picture—automotive—appears to have found its level for a while at least. April production is scheduled to match that of March. Unless sales show more promise than they did in the first half of March, that level—a bit under 100,000 units a week—will prevail right on to model changeover in the fall—barring an autoworkers' strike in June.

James M. Dawson, vice president of the National City Bank of Cleveland, notes that the rate of increase in unemployment so far is similar to that of the 1949 and 1954 recessions. He concludes: "If the current recession continues along this course, the seasonally adjusted unemployment data will rise until June, level off for a few months and then begin to show some improvement in the closing months of the year." He puts the upper limit at 7 million in June when students enter the labor market.



	Awards		Backlogs (end of month)	
	1958	1957	1958	1957
Jan.	401	5,328	48,787	114,656
Feb.	294	6,065	43,750	111,965
Mar.	.....	5,359	.....	107,708
Apr.	.....	6,429	.....	105,190
May	.....	3,423	.....	97,006
June	.....	4,918	.....	91,810
July	.....	1,251	.....	85,229
Aug.	.....	3,203	.....	79,258
Sept.	.....	3,257	.....	71,981
Oct.	.....	2,206	.....	65,718
Nov.	.....	1,070	.....	59,194
Dec.	.....	3,492	.....	55,941
Total	.....	42,051		

American Railway Car Institute.



	1958	1957	1956
Jan.	265,489	276,738	302,203
Feb.	225,631	300,887	286,386
Mar.	.....	312,746	395,686
Apr.	.....	281,627	352,873
May	.....	231,246	326,008
June	.....	207,286	248,326
July	.....	218,276	259,774
Aug.	.....	241,218	276,932
Sept.	.....	302,869	320,278
Oct.	.....	328,655	371,998
Nov.	.....	251,123	300,381
Dec.	.....	237,501	281,025
Totals	.....	3,190,172	3,721,870

Vacuum Cleaners Mfrs.' Assn.

Metalworking Prices Hold

About the only definite uptrend is the cost of living, and it is becoming increasingly clear that metalworking is not responsible for the climb. The all-commodities group forged 0.8 per cent ahead of the February level by the end of March (see Barometers of Business, Page 79). Practically all the extra weight comes from farm products, processed foods, and meats. The "all other" group barely edged above the February level.

In fact, the NAPA survey indicates that there is some softness in industrial prices. List prices have not changed much, but they are being discounted more frequently.

Appliance Industry Uneven

In the appliance and household goods industry, you have to appraise business company by company because of the mixed pattern. Fred Maytag II, president of Maytag Co., believes his company's sales may have equaled those of the year-ago period during first quarter. At the same time, he believes the industry lagged by more than 20 per cent. Elisha Gray II, president of Whirlpool Corp., opines that he wouldn't be surprised to see 1958 end up 10 per cent behind 1957 in appliance sales because of the slow start. But his company is still in the black for the first quarter.

At Frigidaire Div. of General Motors Corp., 1100 production workers and some salaried employees were furloughed last week. Westinghouse Electric Corp. is closing down its Columbus, Ohio, appliance plant this week idling 4000 workers. But at Louisville, General Electric Co. recalled 3800 employees to the refrigerator plant and furloughed 1900 at the home laundry equipment plant.

At their convention in late March, members of the Gas Appliance Manufacturers Association gave glowing reports of their efforts to combat the slowdown in consumers' interest in hard goods. Producers are counting on a fillip from the homebuilding industry this year. Equally important is the enthusiasm home owners are showing for modernization. Among those commodity groups reported ahead of the 1957 pace or headed in that direction are: Central heating units, water heaters, direct heating equipment, unit and commercial heating equipment, incinerators, and automatic controls.

8 REASONS why you should use STERLING BARROWS

1 **ALWAYS READY** to use . . . no fuel or other "operating supplies" needed.

2 **NO "STARTING"** Problems . . . regardless of cold, heat, rain or dust.

3 **NO "HOUSING"** Problems . . . no protective warehousing needed, no covering, no "babying".

4 **NO MAINTENANCE** Problems . . . nothing to get out of order . . . rugged, long-lasting.

5 **EASIEST WHEELING** . . . with choice of pneumatic, semi-pneumatic or steel-tired wheels (plain, ball or roller bearings.) These are the easiest rolling wheelbarrows made!

6 **EASIEST** on the barrow man . . . engineered to balance 4/5th of load on the wheel; only 1/5th of load at handle grips.

7 **EASIEST, CLEANEST DUMPING** . . . Sterlings have steel trays engineered to unload completely, with least effort.

8 **COST LESS PER YEAR** . . . . Sterlings pay off in profits. Their unusually long service life protects your initial investment. And maintenance costs are nil.

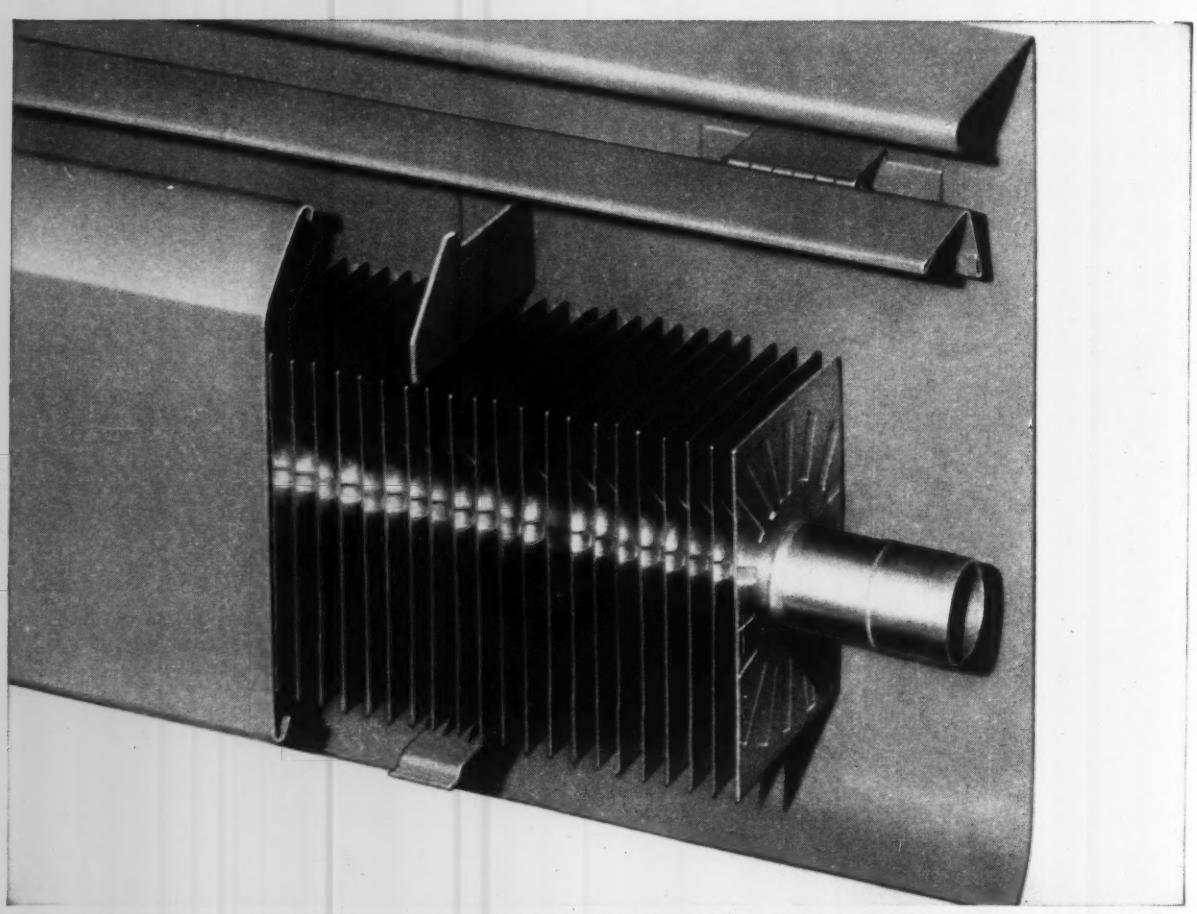
IMMEDIATE SHIPMENT. Write for Catalog.

STERLING WHEELBARROW CO.
MILWAUKEE 14, WISCONSIN, U. S. A.

Look for this Mark of Sterling Quality

Sterling WHEELBARROWS

A7-4513-1¼

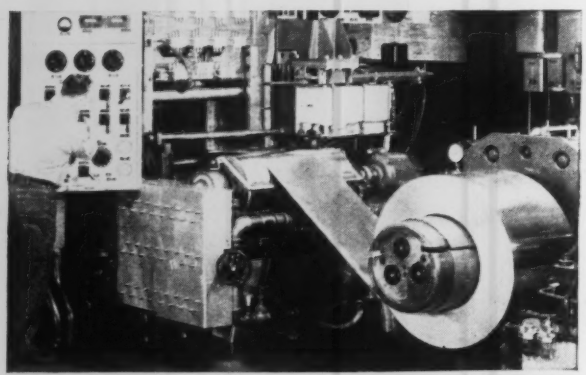


A section of Rittling 750 baseboard radiation. Rittling uses Anaconda Aluminum Alloy 3003-H14, .025 gage in 4" and 4⅜" widths for fins.

"From past experience, we know we can count on Anaconda for quality Aluminum Coiled Sheet."

The Rittling Corp., Buffalo, N. Y., manufacturer of baseboard and fin tube radiation for commercial, residential, and institutional applications has used Anaconda Copper Tube in their units for many years. Now they are using Anaconda Aluminum Coiled Sheet for the fins. "We can always count on The American Brass Company for a quality product," says Mr. Dan Moran, purchasing agent.

Rittling stamps the fins from large coils of aluminum sheet. Copper tubes are expanded into flanged holes in the fins to provide a tight, large-area contact for efficient heat transfer.



Available for prompt shipment to all points in the U. S.

Anaconda Aluminum Coiled Sheet in gages from 0.006" to 0.064" and in widths from ⅜" to 28"; coils up to 100 pounds per inch of width, in alloys: 1100, 3003, 3004, 5005, 5050, 5052.

ALUMINUM COILED SHEET produced to the high standards of quality and uniformity maintained by The American Brass Company is now available for prompt shipment from our Torrington Division to all points in the United States.

It is rolled on the most modern, high-speed equipment, X-ray controlled to close tolerance in gage. High-speed, electronically operated slitters give exact widths with clean edges on evenly and tightly wound coils. Latest type annealing furnaces—with controlled atmosphere and temperature—provide high uniformity of metal structure to meet specified mechanical-property limits.

FOR IMMEDIATE ACTION, contact The American Brass Company's District Sales Office nearest you or The American Brass Company, Torrington Division, Torrington, Conn.

5798 Rev.

ANACONDA®

ALUMINUM COILED SHEET

FRED A. KAUFMAN
Universal-Cyclops v. p.

A. T. STEWART
Veet sales manager

C. BEACH POWELL
joins Cleveland Cap Screw

H. W. WHITMAN
Torrington Mfg. v. p.

Fred A. Kaufman was elected a vice president of **Universal-Cyclops Steel Corp.**, and general manager of its newly organized Refractomet Div. at Bridgeville, Pa., formed to advance the company's participation in commercial development of refractory and reactive metals.

A. T. Stewart was made national sales manager, Veet radial drill, **Veet Industries**, Detroit. He leaves Burns & Roe of Michigan Inc., where he served as vice president and general manager since 1957. He formerly was assistant to the president of Palmer-Bee Corp., and prior to 1954 served as director of purchases for Amgears and Huppower Div. of Hupp Corp.

Robert A. Olen was elected vice chairman of **Four Wheel Drive Auto Co.**, Clintonville, Wis. He is succeeded as president by **Maurice E. Ash**, formerly vice president of Paradynamics Inc., St. Louis. Paradynamics purchased control of Four Wheel Drive in January.

Philadelphia Steel & Wire Corp., Philadelphia, elected **Ezra Garforth Jr.** vice president-sales, steel mill division; **Elmo C. Mincher**, vice president-sales, spring washer division.

Howard A. Halvorson was appointed general sales manager, **Gardner Mfg. Co.**, Horicon, Wis. He was with A. J. Lindemann & Hoverson Co.

E. A. Lindemann, former president of A. J. Lindemann & Hoverson Co., was elected first vice president of **Ampco Metal Inc.**, Milwaukee.

C. Beach Powell joined **Cleveland Cap Screw Co.**, Cleveland, as sales manager, socket division. He was assistant general sales manager of Hartford Machine Screw Co., division of Standard Screw Co.

Martin C. Butters was named executive vice president, **Brubaker Tool Corp.**, Millersburg, Pa. He will also direct operations of the Morton Machine Works, a subsidiary. **George N. Fairchilds** was made vice president-sales; **Jesse W. Elliott**, vice president-manufacturing.

Albert T. Both, since 1953 works manager of the Cleveland Mill Div. of **Chase Brass & Copper Co.**, subsidiary of Kennecott Copper Corp., was appointed assistant vice president-operations. He is succeeded by **Howard C. Walters**, former assistant works manager.

Phillip Hall was made manager of industrial sales, **A. Schrader's Son Div.**, Scovill Mfg. Co. Inc., Brooklyn, N. Y. He was assistant manager, industrial division.

James F. McCartney was appointed assistant to the president of **O. Hommel Co.**, Pittsburgh. He was vice president-general sales manager, Duff-Norton Co.

Frank Jenks, president of **International Harvester Co.**, Chicago, will become chief executive officer in May when **John L. McCaffrey**, chairman and chief executive officer, retires. Mr. McCaffrey will continue as a director and member of the executive committee. The office of chairman will not be filled.

H. W. Whitman was elected vice president and general manager, machine division, **Torrington Mfg. Co.**, Torrington, Conn. He was general manager of the division.

Kenneth T. Carolan was elected vice president of **Carmer Industries Inc.**, Kenilworth, N. J. **Gordon Britt** was appointed sales manager. Mr. Carolan continues as general manager, supervising production of Kel-F, Nylon and Teflon rods, tubes and sheets.

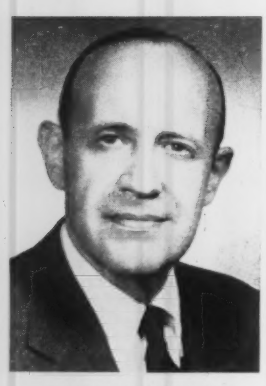
George H. Abendroth succeeds **E. J. Tiefenthaler**, retired, as president of **Worden-Allen Co.**, Milwaukee. **Emil Abendroth**, vice president, assumes additional duties as sales manager. He relinquishes the post of chief engineer.

American Baler Co., Bellevue, Ohio, appointed **Frank Hofstatter** chief engineer in charge of baler design and research. He also will work on special machines and attachments. Mr. Hofstatter previously was with Euclid Div., General Motors Corp.

Jeffrey Mfg. Co. named **Robert J. Brady** manager of the Chicago district office to replace **James Green**, resigned. **William A. Lewis** replaces Mr. Brady as district manager in Jacksonville, Fla. **Robert D. Prushing** was made manager of distributor sales department at the home office in Columbus, Ohio.

Karl C. Wizeman was appointed product manager, metal packing line, **Garlock Packing Co.**, Palmyra, N. Y. He is responsible for marketing of all metal packings. He

E. ALLEN HOLBROOK
Kaiser Aluminum marketing post



CHARLES M. BEEGHLY
J&L executive v. p.

ROBERT W. GRADY
Hartford Machine sales post

JOHN J. BUCKLEY
J. Bishop & Co. v. p.

has been staff superintendent, metal division.

E. Allen Holbrook was named marketing manager for extrusion products, **Kaiser Aluminum & Chemical Sales Inc.**, Oakland, Calif. **W. H. Grimm** was made product manager of extrusions at the general sales offices in Chicago. Mr. Holbrook joined Kaiser Aluminum a year ago as manager of the order allotment division. Prior to that he had been with Pittsburgh Screw & Bolt Corp. and with United States Steel Corp. Mr. Grimm formerly was assistant product manager, extrusions.

Alfred W. Smiley was elected treasurer of **Latrobe Steel Co.**, Latrobe, Pa. **H. S. Saxman** was appointed vice president-finance, continuing as secretary.

Leslie M. Nelson was appointed sales engineer, **Cleveland Instrument Co.**, Cleveland. He was sales engineer in the industrial equipment department of Brush Electronics Co.

Engineering promotions for **General Electric Co.'s** transistor department at Syracuse, N. Y., include: **Sydney O. Johnson**, named manager of transistor advance and design engineering; **Martin E. Clark**, named manager of transistor product engineering.

E. A. Siebert was named executive vice president, **F. B. Redington Co.**, Bellwood, Ill.

Allis-Chalmers Mfg. Co. named **A. P. Bowman** manager of the Milwaukee district office; **James Onarheim** to the new post of manager of utility sales, Milwaukee district.

Charles M. Beeghly was elected executive vice president of **Jones & Laughlin Steel Corp.**, Pittsburgh. He was president of J&L's strip steel division, formed in August, 1957, when J&L purchased Cold Metal Products Co., Youngstown. **Martin K. Schnurr** was appointed president, strip steel division, in addition to his present duties as president of the stainless steel division, also formed in 1957 on acquisition of Rotary Electric Steel Co., Detroit.

Robert W. Grady was made standard products sales manager, **Hartford Machine Screw Co.**, Hartford, Conn., division of Standard Screw Co. He was sales manager, Hanson Whitney Div., Whitney Chain Co.

David Laub was made New York district manager, **Steelcraft Mfg. Co.**

Hamilton Mfg. Corp., Columbus, Ind., elected as vice presidents: **Robert L. Wendling**, vice president-purchasing; **Frank Zeigler**, vice president-production; **Thomas R. Henderson**, vice president-sales.

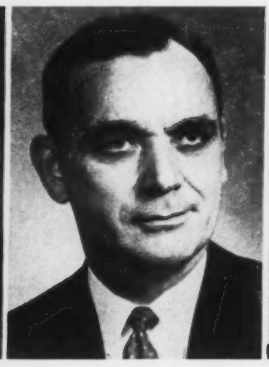
John J. Buckley was elected vice president of **J. Bishop & Co. Platinum Works**, Malvern, Pa., in charge of all company divisions. In addition, he continues as general operations manager of company plants.

Edward N. Hibbert was appointed assistant general superintendent of U. S. Steel Corp.'s **Clairton, Pa., Works**, succeeding **Frederick A. Dudderar**, now general superintendent. Mr. Hibbert formerly was division superintendent, slabbing and plate mills, Homestead, Pa., district works.

Lawrence F. Black was named manager of Utah operations for U. S. Steel Corp.'s **Columbia-Geneva Steel Div.**, and manager of operations of Columbia Iron Mining Co. He is succeeded as general superintendent of the steel division's Geneva, Utah, works by **A. E. Terry. Carl J. Forkum** succeeds Mr. Terry as assistant general superintendent.

Robert M. Bowen was made dealer

ROBERT L. WENDLING

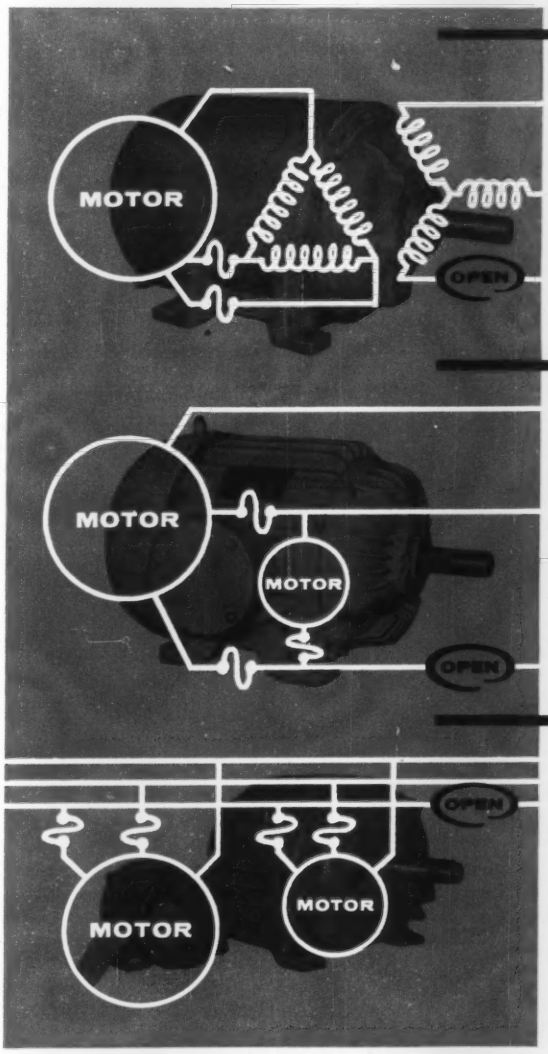


FRANK ZEIGLER

THOMAS R. HENDERSON

Hamilton Mfg. vice presidents

Three-Coil Overload Protection Would Have Prevented These Motor Burn-outs

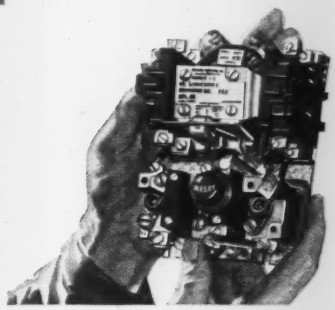


MOTOR No. 1. Even though this three-phase motor was equipped with a 2-coil overload relay, the motor burned out . . . and here's why. Like the vast majority of three-phase motors in use today, this motor took its power from a wye-delta transformer; and an open phase condition in the transformer primary caused one high and two low motor currents. The 2-coil overload relay could not save this motor because the high current was in the unprotected line. Why gamble with a motor burn-out? Insist upon 3-coil overload relays for all your three-phase motors . . . the only dependable overload protection for all open phase conditions.

MOTOR No. 2. This three-phase motor was operating at 70% full load with a 40% loaded single phase motor connected in parallel when one of the incoming power lines opened. Once again the 2-coil overload relay failed to detect any trouble. However the motor current in the winding without a thermal element rose to 152% full load current, while the current in the phases with the 2-element relay did not reach tripping value. This caused permanent damage to the motor winding. This motor could have been saved with full three-phase overload protection. Be sure your three-phase motors are completely protected from the hazards of all open phase conditions with dependable 3-coil overload relays.

MOTOR No. 3. This 1 Hp, three-phase motor was working in parallel with a 10 Hp, three-phase motor when one of the incoming power lines opened. While the 10 Hp motor was not adversely affected by this circuit unbalance, the motor current in one line of the 1 Hp motor reached 140% full load current resulting in a burned out winding. As in the other examples, the 1 Hp motor's 2-coil overload relay proved ineffective because the overload occurred in the one line left unprotected. Don't let this happen to your motors. Insist upon 3-coil overload relays for every three-phase motor, large or small . . . only 3-coil overload relays provide dependable open phase protection under all operating conditions.

Cutler-Hammer Three-Star Motor Control offers 3-coil overload relays in all standard starter constructions and enclosures. For immediate delivery see your nearby Authorized Cutler-Hammer Distributor. Machine designers and panelbuilders, open type Cutler-Hammer Three-Star Motor Control with 3-coil overload relays require no more space than starters with only 2-coil overload relays. CUTLER-HAMMER Inc., 1211 St. Paul Ave., Milwaukee 1, Wis., *Associate:* Canadian Cutler-Hammer, Ltd., Toronto.



CUTLER-HAMMER
★ ★ ★
MOTOR CONTROL
C-H

JOHN J. HANNIGAN
Alan Wood Steel supt.

JOHN P. ZUR
Sunbeam div. chief eng.

HERBERT A. BOAS JR.
marketing dir. at Budd

PHIL CLARKE
Lone Star Steel post

PAUL E. BERNDT
Harvill Corp. v. p.

O. P. CARTER
Midwest Piping president

sales manager of **Ditto Inc.**, Chicago.

Phil Clarke was named manager of hot-rolled steel products for **Lone Star Steel Co.**, Dallas. He joins Lone Star after eight years in steel sales with Youngstown Sheet & Tube Co.

Gordon J. Wygant was appointed aviation sales manager of **Titeflex Inc.**, Springfield, Mass., subsidiary of Atlas Corp.

J. Warren Gillon was appointed manager of customer relations, **Electronic Instrumentation Co.**, Denver, division of Ramo-Wooldridge Corp. He was manager, atomic equipment department, American Radiator & Standard Sanitary Corp.

Wallace F. Meyer succeeds **Byron Erwin**, retired, as resident manager of sales, Minneapolis district, **Jones & Laughlin Steel Corp.**

Ralph J. Canard was named vice president-general manager, **B & H Engineering Corp.**, Whittier, Calif.

Paul E. Berndt was appointed vice president-engineering and manufacturing, **Harvill Corp.**, Los Angeles. He resigned as sales manager of Castmaster Inc., Cleveland. Mr. Berndt was previously plant manager of Harvill from 1948 to 1950.

O. P. Carter was elected president of **Midwest Piping Co. Inc.**, St. Louis. He was executive vice president. Mr. Carter succeeds the late **Eric A. Kerbey.**

L. T. DeLaup was made assistant to the president of Armco Steel Corp.'s subsidiary, **Southwest Steel Products**, Houston. He is succeeded as district sales manager, **Sheffield Div.**, Houston, by **P. T. Babb.**

Don F. Pankoff was made assistant superintendent of the Elyria, Ohio, plant, steel and tubes division, **Republic Steel Corp.**

Wesley A. Carr was named director of engineering at **Traywell Corp.**, San Diego, Calif.

John J. Hannigan was appointed superintendent, open hearth department, **Alan Wood Steel Co.**, Conshohocken, Pa. He was assistant open hearth superintendent.

John P. Zur was promoted from chief engineer-nonferrous metals and wire, to chief engineer of the industrial furnace division, **Sunbeam Corp.**, Chicago. Prior to joining Sunbeam in 1956, he was vice president of Trauwood Engineering Co., and production manager for Lee Wilson Contracting Co.

Herbert A. Boas Jr. was appointed director of marketing, **Budd Co.**, Philadelphia.

OBITUARIES...

Roy H. Glover, 67, chairman of the board of **Anaconda Co.**, New York, died in Washington Mar. 31.

Charles C. Chambers, 69, president and general manager, **Texas Foundries Inc.**, Lufkin, Tex., died Mar. 26.

Harrold L. Gobeille, 63, vice president-marine department, **Cleveland-Cliffs Iron Co.**, Cleveland, died Mar. 31.

John W. Fisher, 49, assistant purchasing agent, **Anaconda Wire & Cable Co.**, New York, died Mar. 24.

Austin L. Hawk, 47, manager, central sales region, **Manhattan Rubber Div.**, Raybestos-Manhattan Inc., died in Cleveland Mar. 21.

Charles L. Chubbuck, 70, senior vice president, **R. C. Mahon Co.**, Detroit, died Mar. 23.

Robert J. Sullivan, 53, manager of the forging division of **Brewer-Titchener Corp.**, Cortland, N. Y., died Mar. 18.

Harold C. Hansen, 68, a founder and vice president, **Modern Machine Works Inc.**, Milwaukee, died Mar. 12.

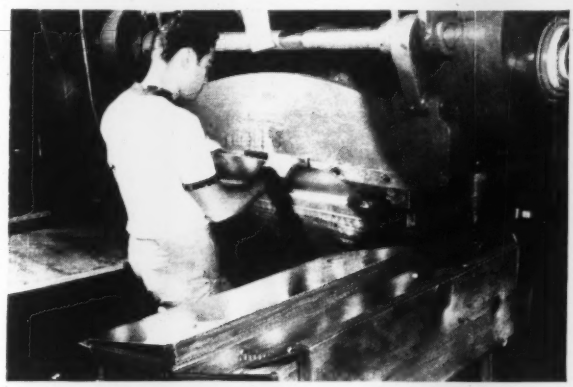
John Y. Levene, president, **Levene's Son Inc.**, Binghamton, N. Y., died Mar. 16.

Robert C. Moest, 49, purchasing agent, **McCauley Metal Products Corp.**, Buffalo, died Mar. 15.

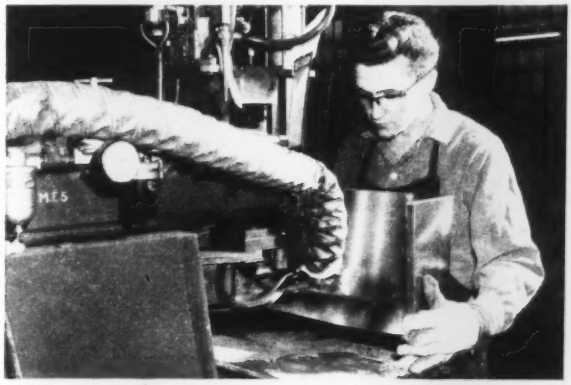
Production Takes A Short-Cut

With Pre-Plated NICKELOID METALS

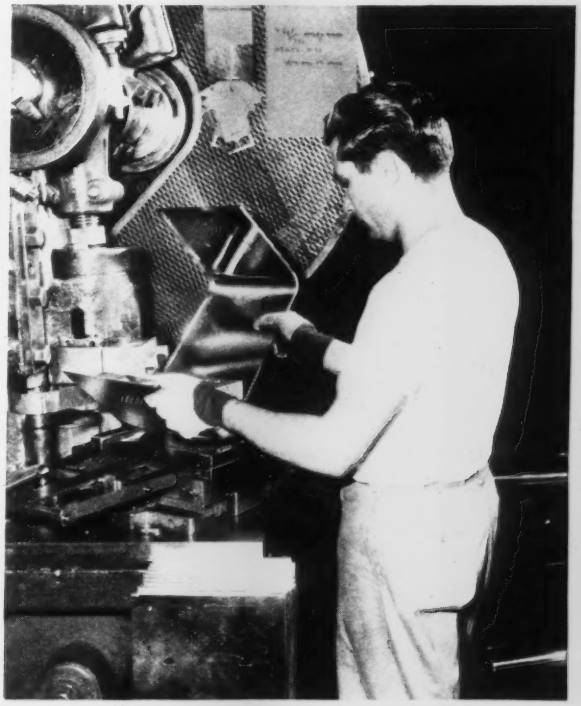
Sheet of Nickeloid chrome-steel that will be used for breadbox is blanked, with punch-out perforations for ventilation and indented shelf supports. Uniform pre-plated finish reduces rejects.



Edges of Nickeloid chrome-steel sheet are turned up 1/2" in forming press. Nickeloid is easily worked with standard methods.



Breadbox body frame is spot welded to the preformed bottom and back pieces, with no visible oxidation. Parts then move to assembly.



Two bends are made on press to give the breadbox its rectangular shape. Operation causes no marring of surface or dulling of finish.

No Cleaning or Post-Plating — Easily Worked With Standard Production Methods

No cleaning solutions, plating tanks or polishing wheels on the production line at Lincoln Metal Products Co., Brooklyn, N.Y., manufacturer of fine pantryware. Lincoln eliminates these costly intermediate steps by using Nickeloid pre-plated chrome-steel and copper-steel. These versatile design materials speed trouble-free production, reduce rejects, prolong tool life. They are readily worked with standard production methods, as shown here. Parts move from fabrication — to assembly — to packing, with no dulling or marring of the pre-plated finish, since Mar-Not protective covering is used. No cleaning, plating, polishing is needed. Nickeloid Metals are available in pre-plated finishes of chrome, nickel, copper or brass on steel, zinc, copper, brass and aluminum. Sheets, strips, coils — a wide range of finishes and patterns.

AT THE DESIGN ENGINEERING SHOW
SEE NICKELOID METALS, BOOTH 103-A

NICKELOID METALS SINCE 1898

AMERICAN NICKELOID COMPANY
Peru 1, Illinois

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS
ARE WHITING CUSTOMERS

Taking a non-stop hop... over a bumper-to-bumper crop!

Highway or aisleway, there's often congestion below. So why depend on meandering, slow-poke traffic to move materials from one point to another in your plant. Materials should go "easy"—up 'n' over via Trambeam Overhead Handling Systems. Above congestion. Up where it's clean, uncluttered. Where it's fast, safe. Where time is gained and production takes wings. Where only costs are down to earth! Look into Trambeam Overhead Handling Systems. Find out details on the two basic types—crane and monorail. See how they're serving all industry . . . how they can serve you. Send for Whiting Bulletin M-20 . . . twenty pages of interesting plain-talk about the "up-to-date" way to move your materials. Address your inquiry to *Whiting Corporation, 15643 Lathrop Ave., Harvey, Ill.*

WHITING

TRAMBEAM

MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY, RAILROAD AND CHEMICAL PROCESSING EQUIPMENT

Convair Builds Wind Tunnel

It uses 1150 tons of steel. An intermittent type with an 8000-hp motor, it is designed for speeds from Mach 0.5 to Mach 5. Chicago Bridge is the prime contractor

NEARLY 1150 tons of steel were used in constructing a 3700-mph wind tunnel at Convair Div., General Dynamics Corp., San Diego, Calif. Included were 120 10-in. H-beam piles, each driven 70 ft into the ground for circuit and building foundation.

Biggest single item in the tunnel is the 97-ton settling chamber where air rushes just before going through the nozzle. The nozzle section (which used 250 tons of steel plates, weldments, hydraulic jacks, and electric drive motors) was assembled to an accuracy of 0.0001 in. to permit positioning of the flexible plates forming the nozzle contour.

An intermittent, blow-down type, the tunnel is designed to simulate speeds from Mach 0.5 to Mach 5 for research on planes and missiles. The test section measures 4 ft x 4 ft. With its 8000-hp motor, it has the same capacity as a continuous-flow tunnel with 150,000 hp.

Principle—The intermittent type wind tunnel uses a comparatively low power system to store energy for long periods for discharge in short bursts at a much higher energy level. Runs at Convair will rarely exceed 2 minutes (average: 30 seconds).

It will use enough electric power to support a town of 1400 persons and enough water in 1 hour to provide service for 14 average homes for a month.

Frigid—Temperatures in the tunnel will drop as low as 7° F (expanding air cools rapidly). Air in the tanks, shortly after a run, will drop to −100° F.

Because of this, each tank contains a bed of alumina balls as a thermal mass for temperature stabilization. To maintain more precise control in the operating range, a bypass system takes air between the second and third compression stages, routes it through a heat exchanger and sends it to the storage tanks at specified temperatures.

Noise—Wave-shaped baffles and a network of steel girders will suppress the noise of sonic booms created inside the tunnel.

Prime contractor was Chicago Bridge & Iron Co., Chicago. Cost: $3.5 million.

Tank Within a Tank

Cambridge Corp., Lowell, Mass., delivered a large airborne double-wall tank to the Air Force at Hanscom Air Base, Bedford, Mass. The outer shell is aluminum; the inner tank is stainless steel. It will be used for fueling the Thor ballistic missile. More than 50 ft long and 8 ft in diameter, it is designed to hold 13,500 gallons of liquid oxygen at −297.4° F. Aluminum fabrication techniques were developed to make the tanks light enough for air shipment yet strong enough to support 170,000 lb of liquid oxygen when full.

Foundries To Make Studies

Chance Vought Aircraft Inc., Dallas, contracted with three foundries to conduct research on three methods of casting high strength steel parts for supersonic aircraft. Contracts (about $250,000 each) were awarded to Stanley Foundries, Los Angeles; Mercast Corp., La Verne, Calif.; and Pacific Alloys, San Diego, Calif. Vought holds an Air Force contract for the project. Each company will work on a different configuration casting.

Titeflex Gets Contract

Titeflex Inc., Springfield, Mass., was awarded a contract by the Air Force for production of components for a radio shielded ignition harness. It was designed by Titeflex for the Air Force and is used on the Pratt

(*Please turn to Page* 92)

Large or small INDUSTRIAL CUT GEARS

- FURNISHED COMPLETE
- CUSTOM CUT FROM YOUR BLANKS
- HEAT-TREATED, CASE OR FLAME-HARDENED

SIMONDS GEAR produces a complete line of industrial cut gears in a full range of sizes from cast or forged steel, gray iron, bronze, Meehanite, rawhide or bakelite. Also heat-treated, case or flame-hardened carbon or alloy steel. Or, you may have your own gear blanks custom cut to your order. Same quality . . . same prompt service. Send us your requirements for quotation.

ALSO stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.

SPUR GEARS • BEVEL GEARS • MITRE GEARS WORMS • WORM GEARS RACKS PINIONS

SIMONDS GEARS

THE SIMONDS GEAR & MFG. CO.

LIBERTY at 25TH PITTSBURGH 22, PA

FIRST BASIC OXYGEN FURNACES

at Jones & Laughlin use Research-Cottrell Precipitators

Industry's toughest gas cleaning problem. That's how they refer to the job of removing dust from basic oxygen furnace gases. Briefly, here's what's involved:

34 pounds of dust for each ton of blast furnace hot metal. 90% of this dust is less than 1 micron. Dust concentration is about 11 grains per cubic foot. Over 98% guaranteed collection efficiency.

The Research-Cottrell precipitators at Jones & Laughlin Steel Corporation's Aliquippa, Pa., plant are designed to process from 250,000 cfm to 400,000 cfm of the above gases at conditions developing a collection efficiency of 98%.

The diagram and text on the next page explain briefly how Research-Cottrell precipitators fit into the basic oxygen steel making process. If you would like more information on how to insure high dust collection efficiencies—at a low cost—get in touch with your nearest Research-Cottrell representative. Whether your problem involves iron blast furnace, ferro manganese blast furnace, open hearth, sintering or other steel industry applications, you can count on an economical solution to your problems at Research-Cottrell.

Research-Cottrell

RESEARCH-COTTRELL, INC. Main Office and Plant: Bound Brook, N. J. • 405 Lexington Ave., New York 17, N. Y. • Grant Building, Pittsburgh 19, Pa. • 228 N. La Salle St., Chicago 1, Ill. • 58 Sutter Street, San Francisco 4, Calif. • Research-Cottrell (Canada) Ltd., 33 Bloor Street East, Toronto 5, Ontario.

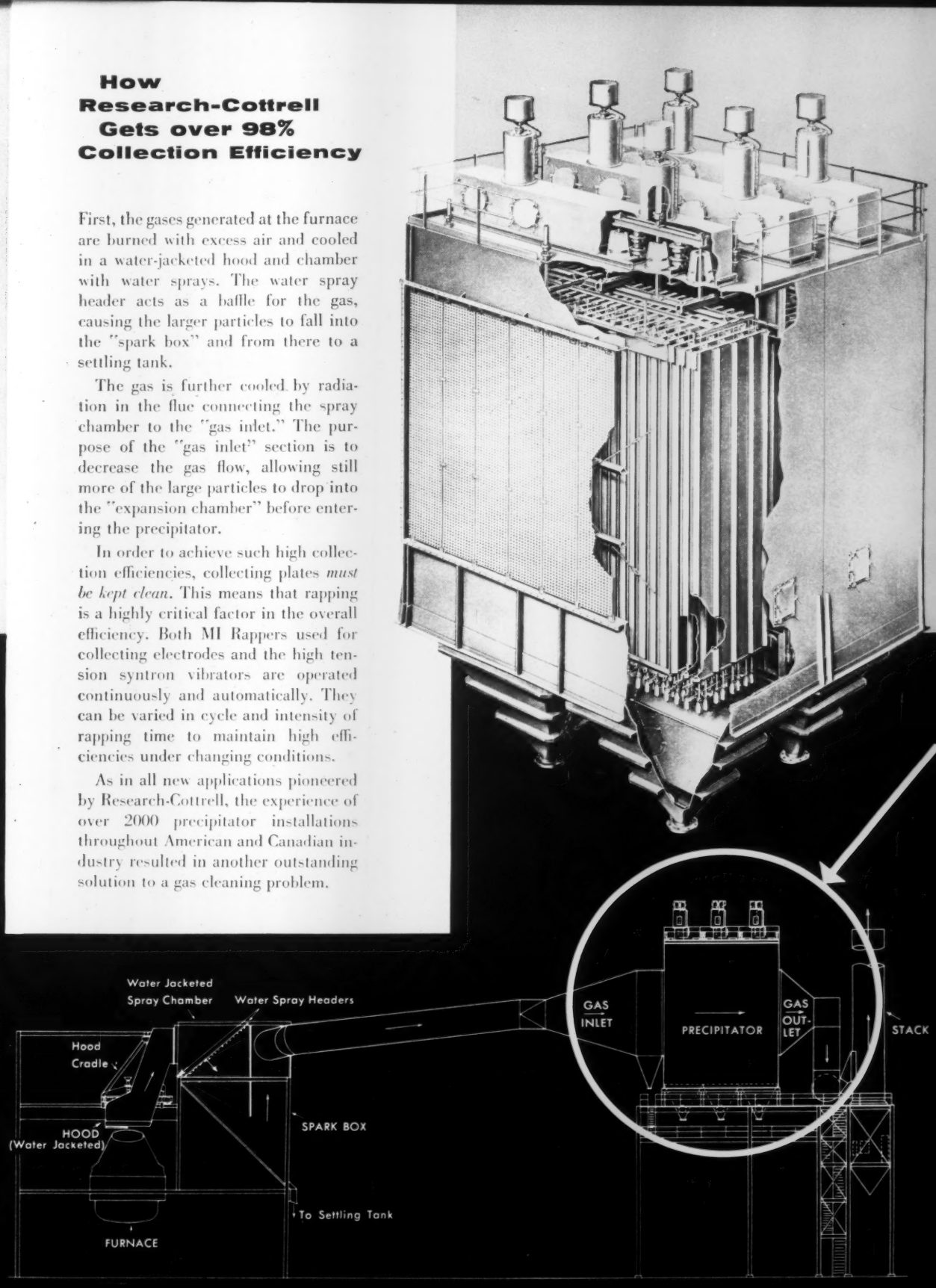
How Research-Cottrell Gets over 98% Collection Efficiency

First, the gases generated at the furnace are burned with excess air and cooled in a water-jacketed hood and chamber with water sprays. The water spray header acts as a baffle for the gas, causing the larger particles to fall into the "spark box" and from there to a settling tank.

The gas is further cooled by radiation in the flue connecting the spray chamber to the "gas inlet." The purpose of the "gas inlet" section is to decrease the gas flow, allowing still more of the large particles to drop into the "expansion chamber" before entering the precipitator.

In order to achieve such high collection efficiencies, collecting plates *must be kept clean*. This means that rapping is a highly critical factor in the overall efficiency. Both MI Rappers used for collecting electrodes and the high tension syntron vibrators are operated continuously and automatically. They can be varied in cycle and intensity of rapping time to maintain high efficiencies under changing conditions.

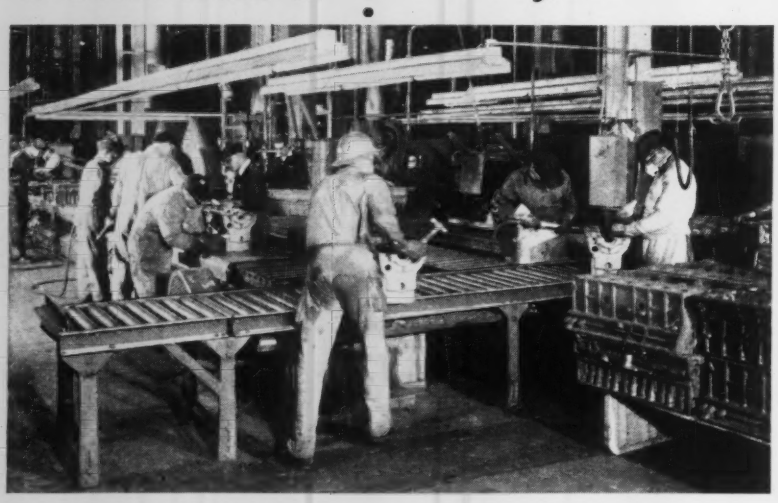
As in all new applications pioneered by Research-Cottrell, the experience of over 2000 precipitator installations throughout American and Canadian industry resulted in another outstanding solution to a gas cleaning problem.



OXYGEN FURNACE GAS CLEANING WITH COTTRELL ELECTRICAL PRECIPITATION

Ask Standard

how to cut costs with conveyors



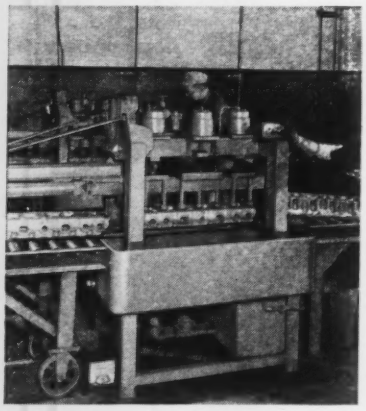
Cylinder blocks are chipped, ground and inspected on Standard Roller Conveyor line.

Eastern foundry simplifies cylinder block handling with roller conveyors

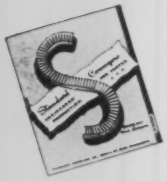
HERE'S another installation in which Standard Roller Conveyors are keeping heavy, bulky components flowing to machining and assembly points with minimum manpower and practically no time loss.

Easy to set up and exceptionally sturdy, Standard Roller Conveyors (live or gravity) can also be job-tailored to your specific materials handling problem — permanent or temporary.

And roller conveyors are only one of the many types of Standard conveyors. Others include belt, slat, chain, pushbar or sectional conveyors as well as spiral chute systems.



Standard Roller Conveyors are available from stock in a wide range of roller diameters, centers and frames.



Call the Standard engineer listed in your classified phone book or write direct for Bulletin 68 — Address Dept. Y-4.

Why not take advantage of Standard's half-century of conveyor application experience. Consult STANDARD CONVEYOR COMPANY. General offices: North St. Paul 9, Minnesota. Sales and service in principal cities.

(*Concluded from Page 89*)

& Whitney R4360 engine. A subsidiary of Atlas Corp., Titeflex designs and produces flexible hose and other aircraft and industrial products.

Big Ball Mill Shipped

Allis-Chalmers Mfg. Co., Milwaukee, shipped to a midwestern cement plant one of the biggest single compartment ball mills ever built in the U. S. Measuring 13 ft by 20 ft, it had to be shipped in two sections and reassembled at the erection site.

Operations Transferred

Roller-Smith Corp., Scranton, Pa., which was acquired last year by Federal-Pacific Electric Co., will suspend operations at its Bethlehem, Pa., plant. The shutdown will idle 300 employees. Roller-Smith's circuit breaker production will be transferred to Scranton.

Shipyard May Come to Life

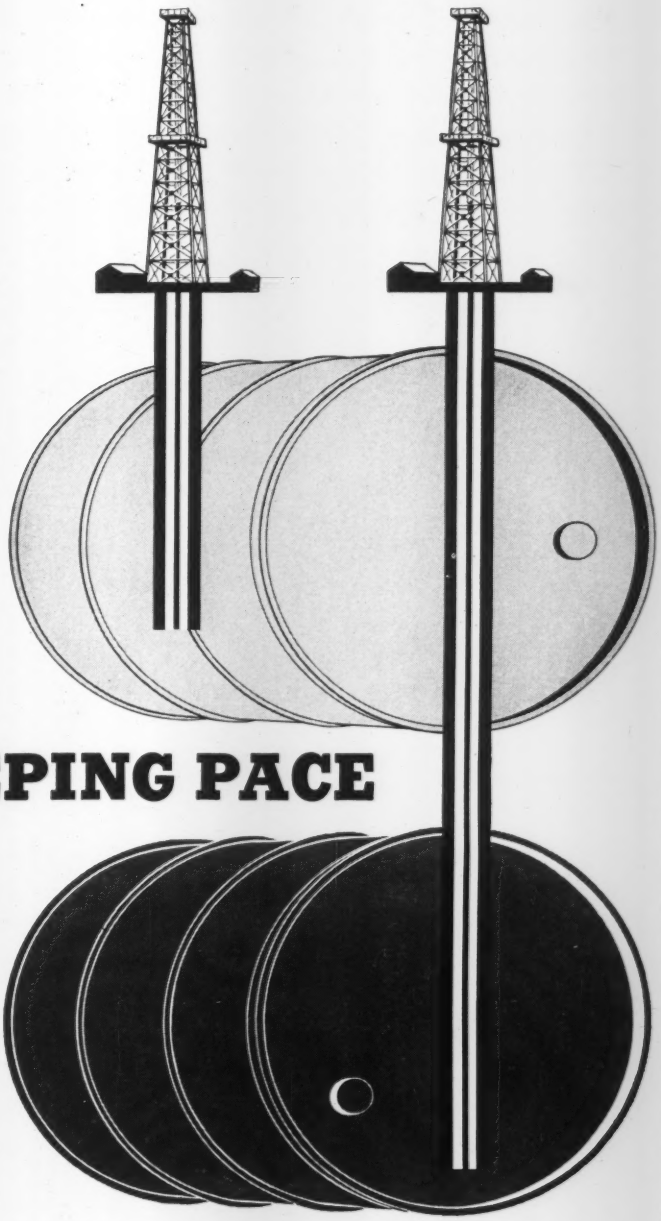
Wagner Iron Works, Milwaukee, bought the Froemming Bros. shipyard in 1945 but never used it for shipbuilding. The company is now seeking Navy ship contracts. A. J. Werner, president, says the St. Lawrence Seaway and plans for increased naval shipbuiding prompted a policy change.

To Build Naval Boilers

Babcock & Wilcox Co.'s Cleveland office received a $2 million contract from Defoe Shipbuilding Co. to build eight boilers for Navy destroyers that will carry guided missiles. B&W officials say the contract duplicates one received last year. They credit the St. Lawrence Seaway with increasing importance of shipyards on the Great Lakes.

RCA Sets Up New Division

Radio Corp. of America has established a Semiconductor & Materials Div. It is responsible for engineering, manufacturing, and marketing of semiconductors and materials and basic components fabricated from them. General man-



KEEPING PACE

Drills were chewing their way down for about 2000 feet in the search for oil in 1916. Today's drilling depth is more than double that.

The change in drilling that forty years has brought well symbolizes many advances in the petroleum and chemical industries. Engineers have dug more deeply into the secrets of nature, too . . . have designed plants and processes to wrest new products and services from petroleum, ores and elements.

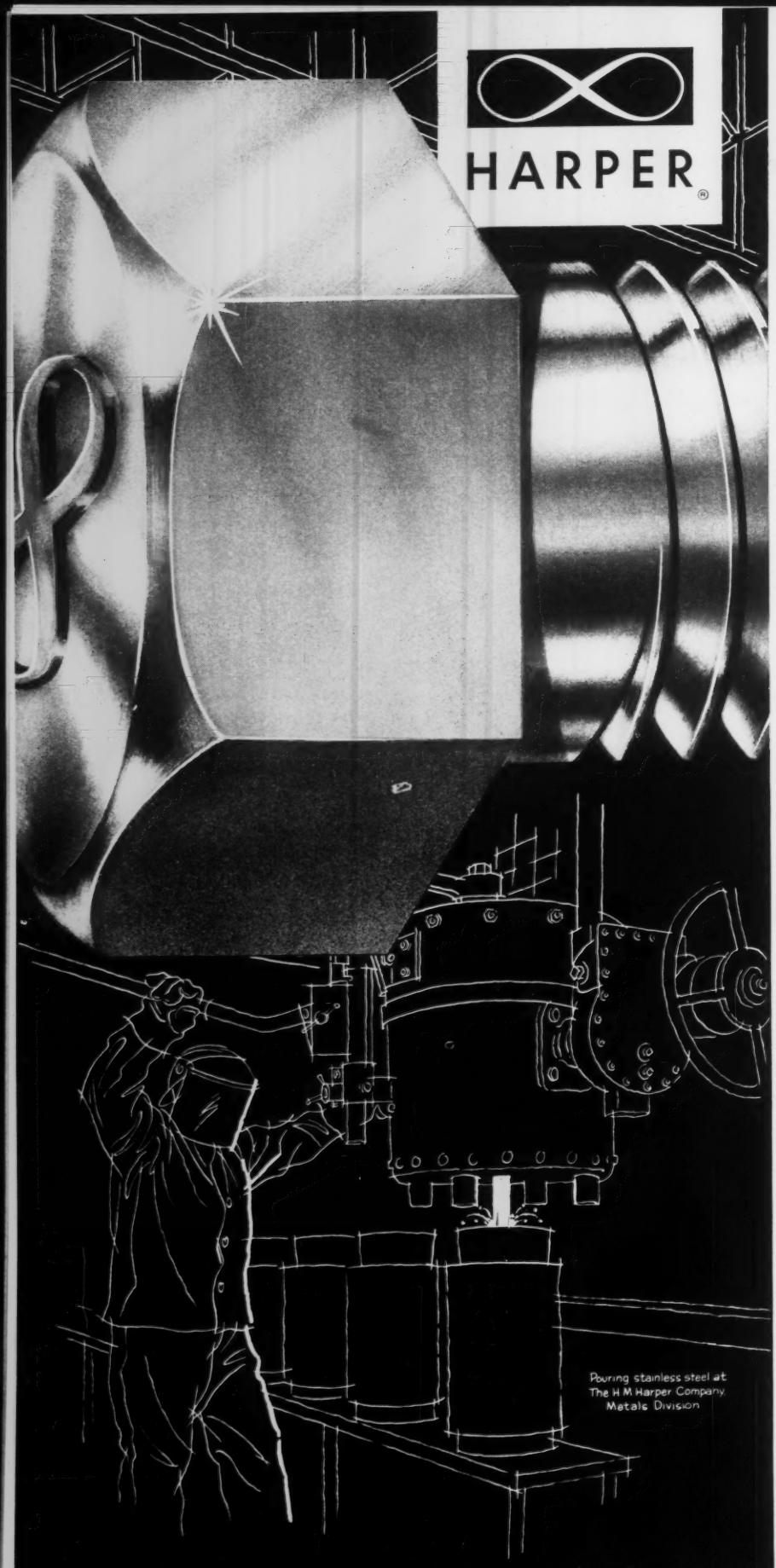
We mentioned 1916 because that is the year Sun Ship was founded. It has long served the swift-growing needs of petroleum and chemical industries. Year by year, the engineering skill and facilities of the great Sun Ship plant have proven their ability to meet the demands for plant and equipment keyed to the swift pace of progress in these and other important fields. Sun Ship keeps pace with progress.

Sun

SHIPBUILDING & DRY DOCK COMPANY

SINCE 1916

ON THE DELAWARE • CHESTER, PA.



Pouring stainless steel at The H. M. Harper Company, Metals Division

ager is Dr. Alan M. Glover. Headquarters will be at Somerville, N. J.

Installs Control System

C & D Batteries Inc., Conshohocken, Pa., installed a new Accu-Ray system for automatic control of the plate-pasting operation in making industrial storage batteries. It will measure and control the amount of lead oxides that go into each battery plate.

J&L Has New Division

Jones & Laughlin Steel Co.'s Strip Steel Div., Youngstown, will market a new electrolytic copper coated strip. Steel for the strip is produced by J&L's new basic oxygen furnaces at Aliquippa, Pa. Annealing and heat treating will be done at Youngstown.

Builds Processing System

Systems Div., Beckman Instruments Inc., Anaheim, Calif., will build an electronic computer data processing system for Continental Oil Co. It is designed to sustain peak operational efficiency in a catalytic reformer at Ponca City, Okla., producing 10,000 barrels per day of high-octane gasoline.

Aluminum Work Boat in Use

A 42-ft welded all-aluminum work boat (beam, 9 ft) has been placed in service by Albert Bernert, tugboat operator, on the Willamette River in Oregon. It was built by Nichols Boat Works Co., Hood River, Oreg.

CONSOLIDATIONS

Basic Products Corp., Milwaukee, will purchase **Sola Electric Co.** through an exchange of $4.6 million worth of common and preferred stock.

Stubnitz-Greene Spring Corp., Adrian, Mich., purchased **Flannery Mfg. Co.**, Pittsburgh. Both firms

produce cushioned seat springs for automobiles.

Borg-Warner Corp. acquired **Precision Engineering & Gear Co.,** Hialeah, Fla., as a branch of its Pesco Products Div., Bedford, Ohio. Edmund W. Guyer, president of Precision, will remain as general manager of the new branch.

Cutler-Hammer Inc. will purchase business and assets of **Airborne Instruments Laboratory Inc.,** Mineola, N. Y., electronics firm, through an exchange of stock. The acquisition will involve nearly $8 million worth of Cutler-Hammer stock. Airborne will be operated as a division of the Milwaukee firm.

Controls Co. of America, Schiller Park, Ill., purchased from **Breese Burners Inc.,** Santa Fe, N. Mex., assets consisting of laboratory equipment, materials, designs, products, plus U. S., Canadian, and foreign patents. Breese specializes in design and development of vaporizing oil burning devices.

NEW PLANTS

Island Creek Coal Co. will build a coal carbonization research laboratory adjoining its quality control lab at Holden, W. Va. The new laboratory is expected to begin operations this year.

Illinois Gear & Machine Co., Chicago, completed a new plant at its South Works. Principal feature of the expansion is a heavy machinery building, 300 ft long and 80 ft wide with railroad track through the center. The building also has a double crane with a lifting capacity exceeding 50 tons.

Westinghouse Electric Corp. opened a new plant near Youngwood, Pa., for production of semiconductor devices, primarily for power applications.

Western Electric Co. opened a new $5 million supply plant at Los Angeles. The firm has 32 such plants.

Shafer Bearing Div., Chain Belt Co., opened a new plant at Downers Grove, Ill. It has isolated heat treating and plating departments, a

(*Please turn to Page* 98)

HARPER®

Corrosion-resistance starts here

CARE . . . from molten metal to finished fastening

In its Metals Division, Harper melts the ingredients of the stainless steels, brasses, bronzes, and now high-temperature alloys, into the proper alloy—and makes the ingots which are extruded into wire and bar and then drawn to exact size needed for bolts, nuts, screws, rivets, and washers (special parts, too).

In its Bolt Division, Harper manufactures all standard fastenings—and designs and produces special component parts that can be produced by cold or hot forging methods.

For 35 years Harper has been the recognized leader in the corrosion-resistant fastening industry. The *metals* knowledge and the *fastenings* knowledge that Harper has gained—coupled with the in-service knowledge of its nationwide Distributors—results in a valued source of supply for you.

Harper works for you. But Harper does still more. Harper provides through its strategically located Distributors complete stocks of *all* corrosion-resistant fastenings. So whether you need a box of small screws or a carload of big bolts, call your nearby Harper Distributor, where you will get immediate availability of the world's finest corrosion-resistant fastenings.

Discaloy bolts being removed from 1800° molten salt bath

THE H. M. HARPER COMPANY

8200 LEHIGH AVENUE • MORTON GROVE, ILLINOIS

usership...

TRADEMARK

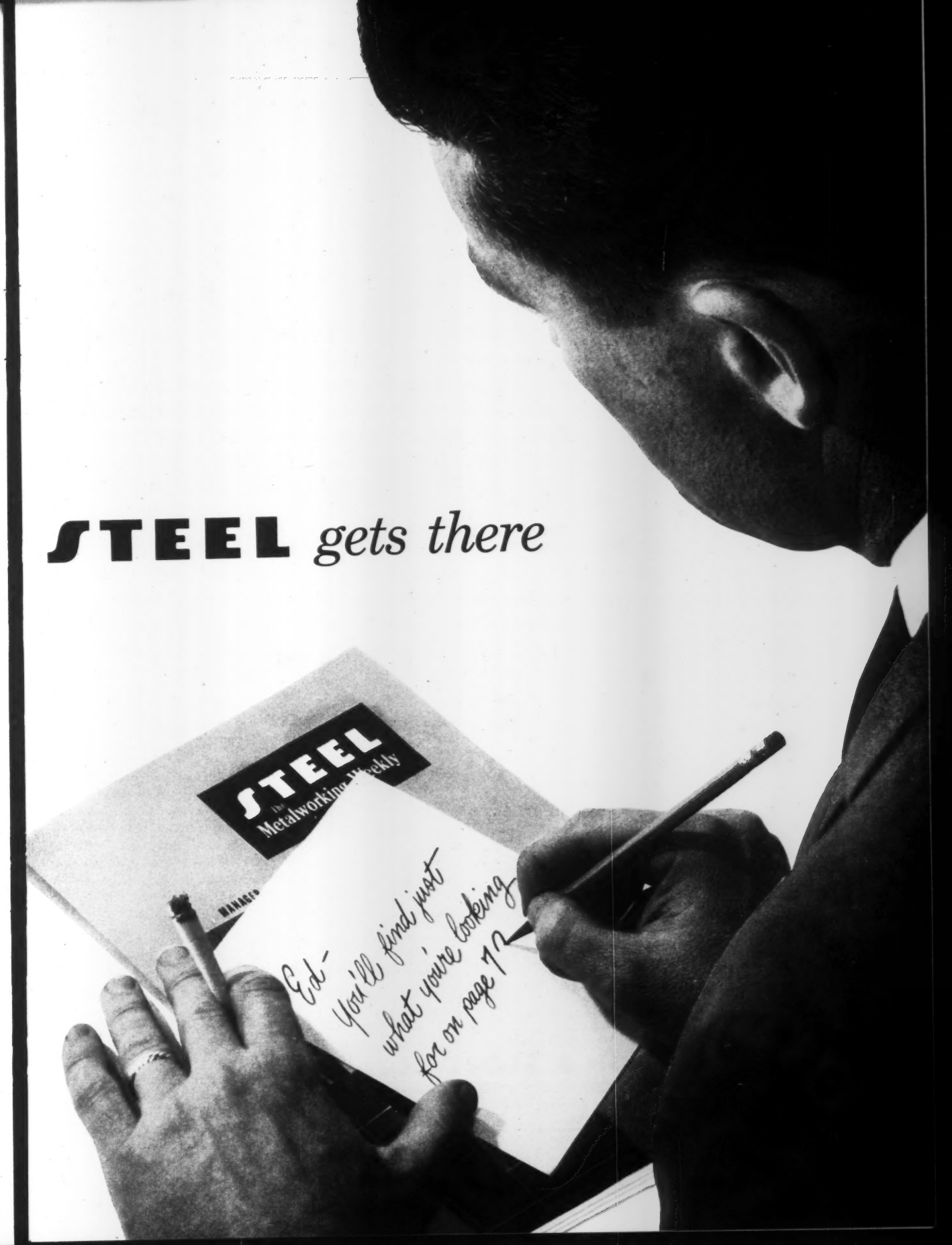
what happens after

The power, the excitement, the force that enables a magazine to *move* readers to action is wrapped up in this one word. STEEL has this power, because STEEL attracts readership of the men who are leading metalworking's progress. They depend on STEEL. They *use* STEEL. They read. Then they act.

Example: Brainstorming, introduced to metalworking in a STEEL article, is now used by forward thinking companies throughout the industry.

When STEEL arrives in a plant, there's action. That is why more advertisers to metalworking are placing more advertising in STEEL than in any other magazine.

usership is the strength of STEEL

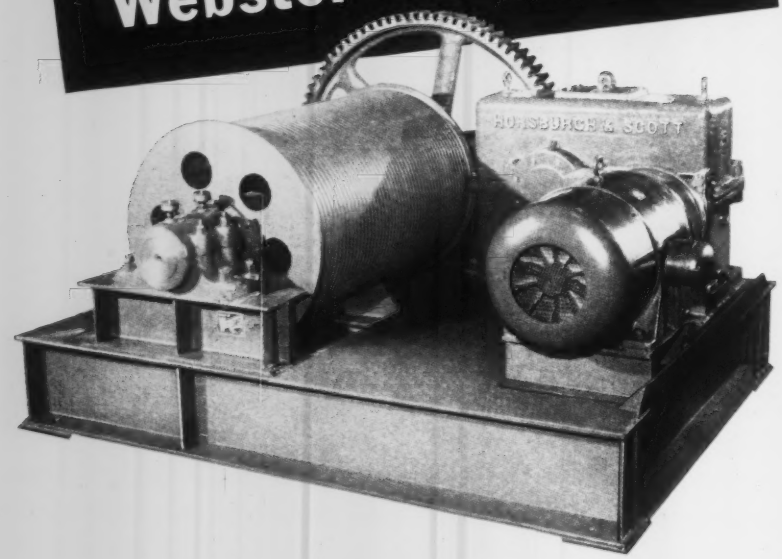

STEEL gets there
STEEL
Ed
You'll find just
what you're looking
for on page 17

Wide range of large

H&S Speed Reducers

meets needs of

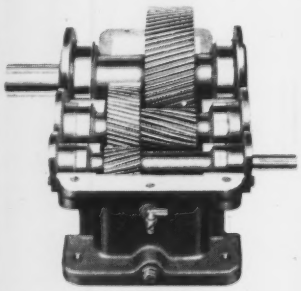
Webster Car Pullers



Here's a job that calls for rugged power and dependable gearing — pulling fourteen 75-ton railroad cars along a straight track, up a 1% grade, at a speed of 40 ft. per minute.

Webster Manufacturing, Inc., Tiffin, Ohio, easily solved this problem with the construction of a 50 HP Webster Car Mover. As part of this unit, Webster selected a Horsburgh & Scott Helical Gear Speed Reducer because it provided the necessary stamina for this high-torque job . . . unusually heavy bearings to withstand the greater overhung loads incident to car-puller operation.

From the same source — Horsburgh & Scott — Webster obtains the necessary extra heavy machine cut spur gears that drive the cable drum.



Seventy years of experience prove that *rugged construction* and *ample overload capacity* of H & S products assure trouble-free service and operating economy. Send us your requirements or contact your nearby H & S representative for prompt recommendations.

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 Hamilton Avenue
Cleveland 14, Ohio

(*Concluded from Page 95*)

centralized cooling system for grinding machines, and an atmosphere controlled assembly area.

General Electric Co. will build a new plant near Phoenix, Ariz., for its **Computer Div.** Work will begin in May.

Calumet & Hecla of Canada Ltd. opened its new Wolverine Tube plant (cost: $7 million) in North London, Ont. It will produce nonferrous seamless tubing.

Youngstown Sheet & Tube Co. will build a new sintering plant at its Indiana Harbor Works, East Chicago, Ind. It is scheduled for completion next spring. Capacity: 4200 tons of sinter products daily.

Hill-Chase Steel Co., Baltimore, completed a 4000 sq ft addition to be used for storage.

Joseph Behr & Sons Inc., Rockford, Ill., opened a new building for scrap metal preparation and handling. It contains 35,000 sq ft, six truck docks, five railroad docks, four floor scales, and two balers.

Anchor Steel Warehouse Inc., Kansas City, Mo., will build a $300,000 warehouse on a tract adjoining its present facilities.

ASSOCIATIONS

Prefabricated Home Manufacturers' Institute elected these officers: President, Horace N. Durston, vice president, American Houses Inc., Allentown, Pa.; vice president, E. E. Kurtz, Inland Homes Corp., Piqua, Ohio; secretary - treasurer, Fred Samerdyke, Harnischfeger Homes Inc., Port Washington, Wis.

Metallurgical Society of the **American Institute of Mining, Metallurgical and Petroleum Engineers** elected these officers: President, Dr. Walter R. Hibbard Jr., manager, alloy studies research, General Electric Co., Schenectady, N. Y.; vice president, John C. Kinnear Jr., general manager, Nevada Mines Div., Kennecott Copper Corp.; treasurer, T. D. Jones, American Smelting & Refining, Perth Amboy, N. J.; secretary, Robert W. Shearman of New York.

A LITTLE GOES A LONG WAY! Don't overlook vanadium! Though vanadium has been an alloy "staple" for years, it's still one of the most useful and important alloying elements. No other alloy is as versatile as vanadium. And because vanadium is so *effective*, just a *little* does a big job. What's more, vanadium is plentiful and economical — actually costs no more than it did thirty years ago!

Why not discover — or reappraise — vanadium as it applies to your operations in tool and other alloy steels, large forgings, deep drawing steels, and iron and steel castings.

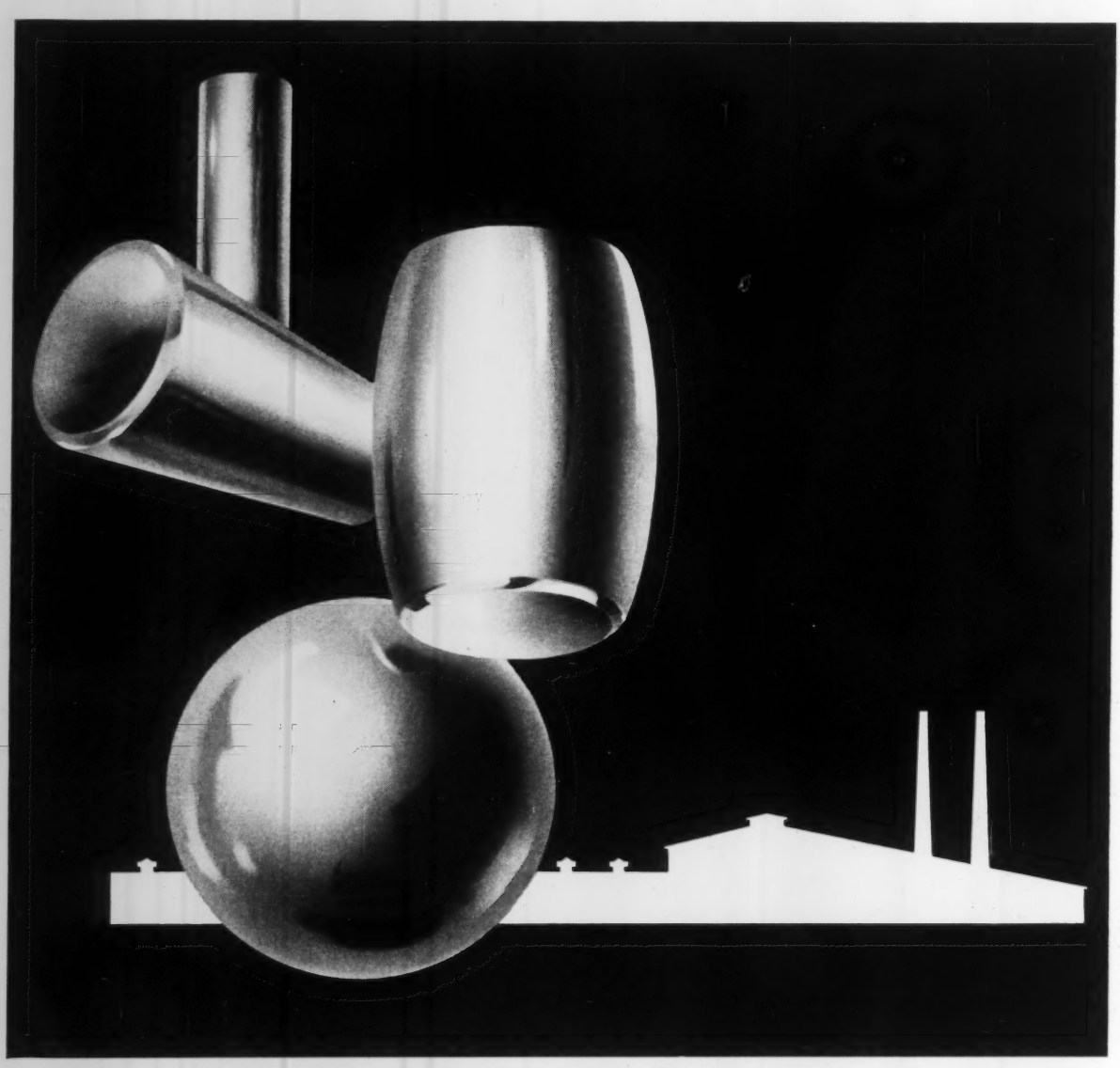
Versatile vanadium is also used in aluminum-base and titanium-base alloys, in glass, ceramics, inks, coloring agents, and in catalysts for synthetic textiles and petroleum refining. Your nearest VCA Office can tell you more about the advantages and economies of Vancoram Vanadium Products. Call today! Vanadium Corporation of America, 420 Lexington Avenue, New York 17, New York.

BE SURE TO SEE US AT THE AIME OPEN HEARTH MEETING — Hotel Statler-Hilton, Cleveland, Ohio — April 14-16!

Producers of alloys, metals and chemicals

VANCORAM

VANADIUM CORPORATION OF AMERICA



the multi-purpose grease with "special" performance

Here is one multi-purpose grease that actually performs better than a great many "special purpose" greases for all types and sizes of bearings – even under extreme *pressure*, *temperature* and *moisture* conditions.

Nebula EP retains its outstanding lubricating properties at temperatures above the limits of a number of special heat-resistant greases. But unlike many high-temperature greases, Nebula EP possesses high anti-wear and load-carrying qualities – comparable to those of most specialized extreme-pressure greases. Nebula EP's *constant consistency-temperature characteristics are among its most outstanding features.* Another important Nebula EP advantage: excellent oxidation stability, assuring long service and storage life.

Now available in three grades, Nebula EP is well suited to *all* types and sizes of bearings . . . can be applied by hand packing, grease cup or gun, or through a centralized system. For complete technical information, contact the nearest Esso Standard Oil Company Division Office: Boston; Pelham, N. Y.; Elizabeth, N. J.; Bala-Cynwyd, Pa.; Baltimore; Richmond; Charlotte; Columbia, S. C.; Memphis; New Orleans.

NEBULA® EP

Esso

ESSO RESEARCH works wonders with oil

Technical Outlook

GLASS BEATS HEAT—More products made from Pyroceram seem to indicate that uses for this remarkable glass are still on the increase. Latest shapes: Tubing, rods, and sheets. Products: High temperature piston heads, aircraft structural parts, building curtain walls, ball bearings. They can be heated to 1300° F and plunged into cold water without harmful effects, says Corning Glass Works, Corning, N. Y.

FASTER X-RAY FILM— Eastman Kodak Co. has announced a new industrial x-ray film which is 50 per cent faster than its present product. Called Type KK, it will replace Type K. It is expected to be particularly valuable in cutting the exposure time of thick metal sections. Sensitivity compares favorably with that of the Type K film, the company says, and price will be the same.

CADMIUM PLATING TECHNIQUE—Hydrogen embrittlement of cadmium plated, high strength steels can be eliminated by this process: Stop the plating when the deposit is 0.0001 in. thick, and bake the steel to drive out the hydrogen. Any thickness of cadmium plate can then be deposited on the steel without danger of failure. The treatment was developed by Dr. Alexander R. Troiano, professor at Case Institute of Technology, Cleveland.

FLUORINE RUBBER—Teflon, Du Pont's successful fluorocarbon plastic, has a rubber cousin. Christened "Viton," the new elastomer is about to graduate from pilot to commercial production. It's said to have unequaled resistance to oils, fuels, and solvents at temperatures above 400° F. It will be available for civilian uses such as seals, insulation, gaskets, hose, and fuel cells.

STRONGER BUCKETS—Present methods for making aircraft turbine buckets of Udimet-500 (a nickel-base alloy, age hardened by additions of titanium and aluminum) compromise strength to achieve ductility. Research at Thompson Products Inc. shows that the ductility depends on the microstructure of the Ni_3 (Al, Ti) precipitate, and high hot strength on the grain size. Under study are processing methods which will control both properties independently, leading to greater strength with ductility.

RECTIFIER FOR HOT SERVICE— Westinghouse scientists have developed a silicon carbide rectifier that operates up to 1300° F—above the melting point of magnesium and aluminum. First application will be in control equipment for rockets, missiles, and high-speed aircraft.

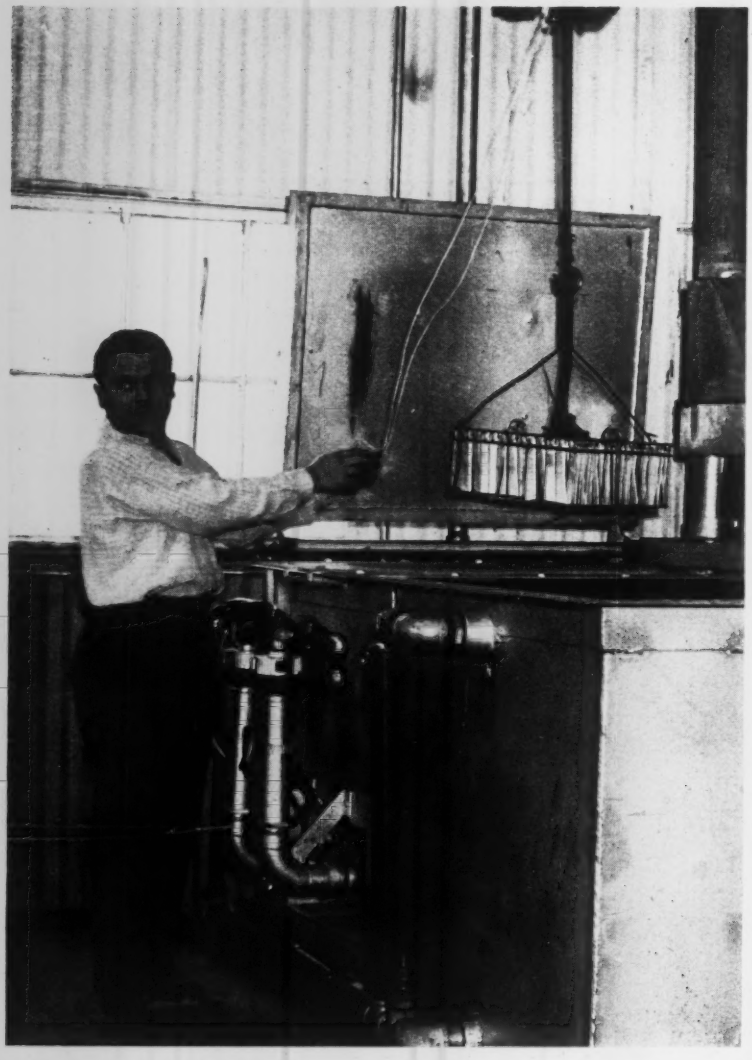
GLASSED STEEL TIPS—Pfaudler Co., division of Pfaudler Permutit Inc., Rochester, N. Y., offers these suggestions for glass-lined vessels: 1. Keep operating temperatures under 450° F. 2. Keep temperature differentials within 200° F. (Range declines as operating temperature increases, dropping to 115° F at 450° F.) 3. Don't weld to the tank proper. Use arcwelding for the jacket. Keep at least 2 in. away from tank.

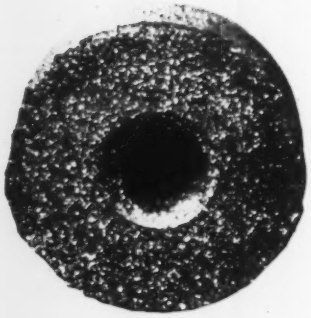
WHOSE DIRT?—Has the community pointed an accusing finger at your smokestack? Stanford Research Institute, Menlo Park, Calif., has a new method for finding out where air pollution is really coming from. It uses a uranine dye and field detection units that can make quantitative measurements of its dispersion in the air.

AUTOMATION SCORES AGAIN—This time it's the drop hammer, almost the last stand of muscle, which is being automated. Chambersburg Engineering Co. has introduced an electrically controlled gravity drop hammer that can utilize automatic feeding devices.

SAND SUPPORT—Slab grinders in a Swedish steel mill support the slab on a bed of sand. It damps vibrations, reduces wheel wear, and makes loading and unloading easier. Although the grinder table oscillates, the weight of the slabs is enough to keep them from shifting in the sand.

Metalworking Outlook—Page 55 Market Outlook—Page 135





Small wheels for a precision instrument—magnified 25 times. Burrs, like those on part above, have been ultrasonically removed from the part below. Despite intense scrubbing action, critical dimensions are unchanged

Parts are being lowered into a agitated etchant for . . .

Deburring with Ultrasound

Process is a natural when burrs are hard to remove any other way. Example: In replacing manual scraping of fine burrs from a precision part, it cuts deburring costs about 98 per cent

WHEN the removal of small burrs from close tolerance parts by conventional methods is difficult or expensive, consider ultrasonic deburring.

The recommendation comes from production men at Research Associates Labs Inc., Los Angeles. They have this to say about the process:

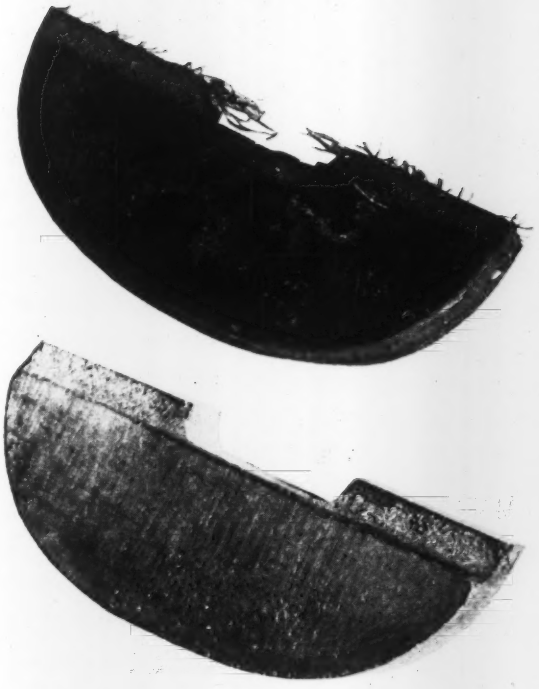
No Substitute — Ultrasonic deburring won't take the place of standard techniques like filing, grinding, honing, and sandblasting. It becomes practical when other methods start giving poor results.

It can, for example, get rid of burrs invisible to the naked eye—and will do it without altering tolerances of precision instrument parts as much as 0.000005 in.

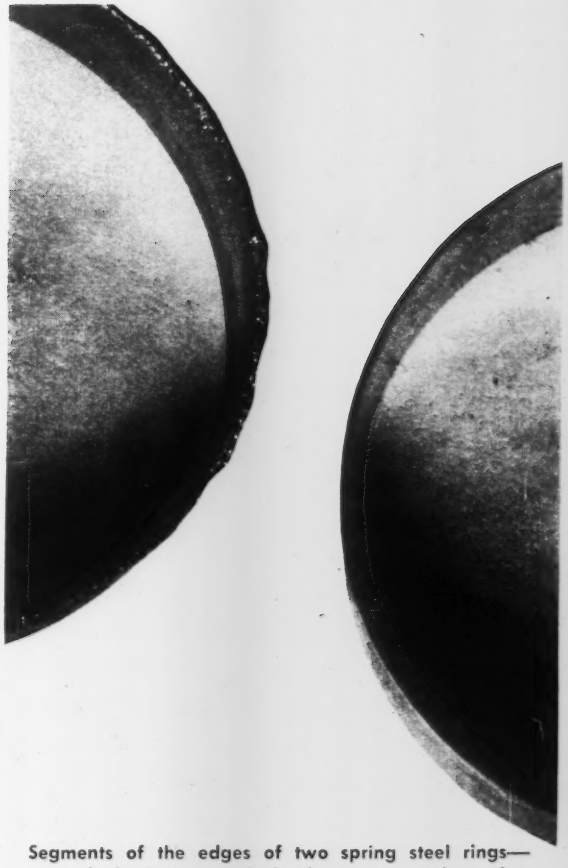
Conventional ultrasonic equipment will handle the job.

How It Works—Parts are dipped in a solution, which is ultrasonically agitated. As a rule, the solution is water, containing a small quantity of acid or alkaline etchant. The kind of etchant is determined by whether the parts are ferrous or nonferrous.

The solution attacks burrs and many types of foreign matter without removing appreciable quantities of the parent metal.



Castings for small permanent magnets—magnified ten times. Both parts were photographed after machining. The one below has been ultrasonically deburred. Frequency of agitation depends on the material



Segments of the edges of two spring steel rings—magnified 65 times. Both photos were taken after machining; part at right has been ultrasonically deburred and is accurate within ±0.001 in.

Wave frequencies are varied to accommodate materials with differing acoustical properties. Evidence shows that frequencies well below 30,000 cycles per second will meet nearly all requirements. The frequencies can be obtained with a variety of commercial magnetostrictive transducers.

Cleanser—Besides being an effective eradicator of surface burrs, ultrasonics in a mild etching solution quickly remove unwanted materials in normally inaccessible recesses like holes with backdrafts or undercuts.

The etchant content of processing solutions is so small that parts could be immersed for several hours without undergoing noticeable changes, if the solutions weren't ultrasonically agitated. Cold-water rinsing and infrared drying prevent unwanted etching following deburring.

Tooling—Small metal parts can usually be deburred in batches without special fixturing at the rate of about 100 an hour. Large and intricate parts are sometimes fixtured to facilitate deburring in specific areas, but, since standard holding devices can be used as fixtures, no special tooling problem is posed.

Components with especially large or heavy accumulations of burrs may be partly deburred by conventional methods to minimize ultrasonic processing time.

Because the method has no measurable effect on the chemical and physical properties of metals, materials should be heat treated or hardened beforehand to minimize the need for cleaning operations.

In general, any metal part that has been degreased will become microscopically clean when it is ultrasonically deburred—this adds to the effectiveness and economy of subsequent operations, such as welding, brazing, soldering, plating, and spray finishing.

How Much?—Cost is not always an important consideration simply because comparable work can't be done any other way. But it is relatively low in almost every case.

For example, where manual scraping is now required to remove fine burrs from precision instrument components, the process can reduce deburring costs about 98 per cent. While electropolishing methods are satisfactory for gears and shafts, ultrasonic processing can save close to 50 per cent.

Leading Uses of Plastic Laminations

TRANSPORTATION

- Automobile, bus & airplane interiors
- Automotive components
- Railroad car ceilings, wall paneling
- Mobile home interiors
- Shipboard bulkheads

INDUSTRIAL

- Storage tanks
- Steel drums
- Display cases
- Chemical resistant ductwork

APPLIANCES

- Air conditioners
- Hi-fi components
- Portable TV & radio cabinets
- Record player cases

HOUSING

- Furniture
- Doors
- Lamp bases
- Kitchen walls

BUSINESS

- Typewriters
- Computer cabinets
- Desk tops
- Magnetic maps & bulletin boards

OTHERS

- Camera housing
- Luggage
- Picnic jugs
- Boat decking
- Rifle & pistol cases

Laminating vinyl to steel sheets is continuous process at the Denver plant of Clad-Rex Steel Co. Sheets are separated by cutting through the plastic film

Plastic-Coated Metals Ride Uptrend

The product is catching on. Fabricators say it is easy to form by ordinary methods. Product's advantages include high styling, unlimited color, chemical resistance

"PLASTIC-LAMINATED steel is stepping out of the laboratory and taking its place as a production material in a growing number of applications."

That's the way U. S. Rubber Co., New York, assesses the progress of a product which was just getting started a little more than three years ago (STEEL, Dec. 6, 1954, p. 116). Its Marvibond process is one of several being used to produce the material.

Catching on — Fabricators have been quick to recognize its production advantages (it's easy to work with) and product advantages (chiefly high styling, an unlimited color range, and chemical resistance).

A fabricator comments: "We can roll-form, lock-form, and deep draw laminates in the same manner and with the same limits as cold rolled, deep drawing steel. Laminates can meet high heat specifications with-

This machine laminates magnesium to vinyl at Shwayder Bros. Inc., Detroit. The drying chambers are controlled to bring the temperature of the magnesium sheet to 300° F

out delaminating. We can't arcweld the metal, but we can spotweld it with special equipment.

Says J. W. Kendrick, vice president, Met-L-Wood Corp., Chicago: "Few fabricating problems worry firms working with plastic laminates. Vinyl-metal sheets are perforated as easily as base metal sheets without vinyls. Ease of fabrication and improved properties justify their use, although they cost more than other types of finishes."

Also cited often: A low percentage of rejects. For example, a laminator supplied a major automaker with 250,000 kick shields. None was rejected. An appliance firm had the same experience with 7200 plastic-metal television cabinets.

Application Range—Indoor uses predominate. Shwayder Bros., Detroit, produces vinyl-clad magnesium luggage and vinyl-clad steel furniture. It furnishes clad steel to other manufacturers for fabrication into automobile interiors, portable television cabinets, picnic tables, display cases, and beverage coolers.

Met-L-Wood says its laminates are used for railroad car ceilings, doors, partitions, seat backs, and convector panels. They also find application in interiors of buses and aircraft and in steel tanks in which the chemical resistance of vinyl prevents corrosion.

Standard Can Corp., Pittsburgh, reports excellent results with plastic covered, cold rolled strip steel for wastebaskets and trays.

Methods—U. S. Rubber has a hot method of continuous laminating, using thermoplastic adhesives and polyvinyl chloride. The company supplies vinyls to laminators who apply a 4 to 20 mil film of plastic to base metal—steel, aluminum, copper, brass, or magnesium. It has some 15 licensees.

National Supply Co., Pittsburgh, sprays and bakes vinyl plastic on the inside of drill pipe and tubing subject to corrosion fatigue. A plastic that withstands high temperatures in deep wells has been developed by researchers.

Jones & Laughlin Steel Corp., Pittsburgh, is marketing rigid polyvinyl chloride tubing which is jacketed with resistance welded steel pipe. The corporation expects to find wide applications where corrosion is a problem, particularly in oil production.

U. S. Steel Corp., Pittsburgh, is experimenting with the material. It is testing vinyl coated sheets on buildings at its Saxonburg, Pa., sintering plant.

Outlook—"Three years ago, laminates were only under development. We haven't reached our full potential yet, but we're clearly headed in that direction," say U. S. Rubber sales officials.

"The product is gaining stature; fabricators are gaining experience; and product quality is standardized at a high level," concludes Mr. Kendrick.

This 27 ft Rotoblast handles one totebox of material. It's dumped into the hopper in the foreground which loads the unit. The empty totebox is placed under discharge, saving extra handling

Unit Saves Cleaning Time

One large blast cleaner does more than double the work of two small machines: It takes half as many men to operate it. Here's how a cleaning jobber benefits

AN OUTSIZE machine more than doubled blast cleaning production and cut labor in half at the Bellevue Porcelain Enameling Co., Detroit.

The firm cleans welded stampings, forgings, and fabricated assemblies for automakers and the electrical industry. The equipment was originally purchased to handle the firm's own porcelain requirements.

Two-Pronged Efficiency — Under the old setup, material handling was a problem at Bellevue. Incoming toteboxes had to be dumped into two others for each 14 ft Pangborn Rotoblast machine. After cleaning, the loads were returned separately to the original totebox.

The new machine, a 27 ft Rotoblast, eliminates the double handling. One totebox is enough to carry one load to and from the machine.

Faster cleaning is provided by two wheels in the new machine. The old 14 ft units, now standby equipment, have only one. Better abrasive coverage assures uniformly clean parts.

Time—It takes about 4 minutes to clean the easier parts and up to 14 minutes for tough ones like engine connecting rod forgings. Loads vary from 225 lb (conveyor hooks) to 2300 lb (forgings).

The larger machine also reduces operator effort. He merely pushes a button to start the loader. Blast and tumbling cycle are automatic.

Bellevue uses Pangborn G-40 and G-50 angular grit. During operation, a cleaning and reclaiming unit removes scale and debris. A rotary scalper removes large fragments. Smaller particles and abrasive fall through a screen onto a conveyor which carries them to a separator. Spent abrasive and scale are removed. Good abrasive drops into a storage bin.

Extends Lift Range

Telescoping boom carries hoist farther, permits easier handling of bars, pipes, screw stock

A TELESCOPING boom solves the problem of loading or unloading bars, rails, pipes, and similar long materials.

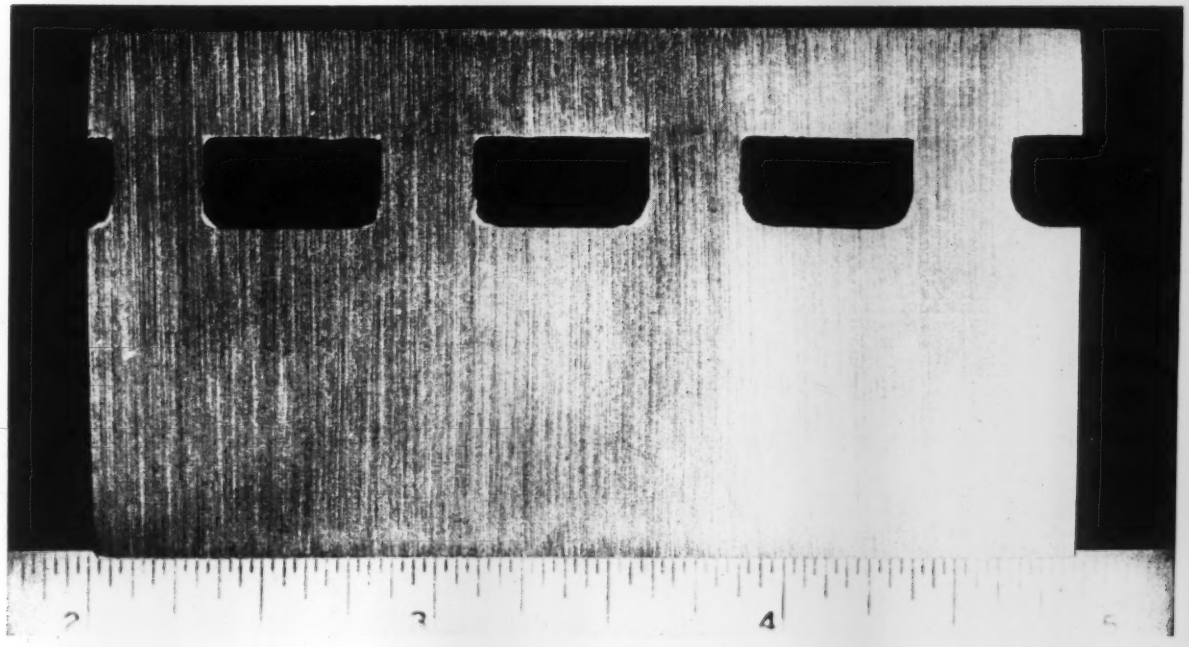
Formsprag Co., Van Dyke, Mich., formerly unloaded bar stock by hand and dragged it through a doorway to a crane for transfer to a storage area.

Michigan Crane & Conveyor Co., Detroit, designed the telescoping boom girder shown. It carries a hoist from the building to the truck. Loads are lifted easily into the stock area.

The hoist runs on a single girder and can be moved to a crane in another bay.

A switching point also permits running of the hoist to rod or bar storage areas.

GIVES HOIST . . . a longer reach



Close-up of Hortonclad section shows ¼ by ½ in. channels which can be located any distance between upper or lower surfaces. Cladding is on top; base plate is mild steel

Hollow Plate Speeds Heat Exchange

Built-in channeling cuts the cost of heating or cooling big equipment. Clad material is a combination of corrosion resistant metals and mild steel. It can be formed

A NEW construction material called Channeled Hortonclad makes the heating or cooling of heavy duty equipment comparatively simple.

Applications include heated platens in laminating presses, venturi sections in hypersonic wind tunnels, and critical cooling partitions in chemical reactors, says the maker, Chicago Bridge & Iron Co., Chicago.

Because the plates can be roll formed, they are expected to be used for pressure vessels and atomic reactors. Their greatest potential: Heavy chill plates for handling hot work and heated platens and forms for molding assembly.

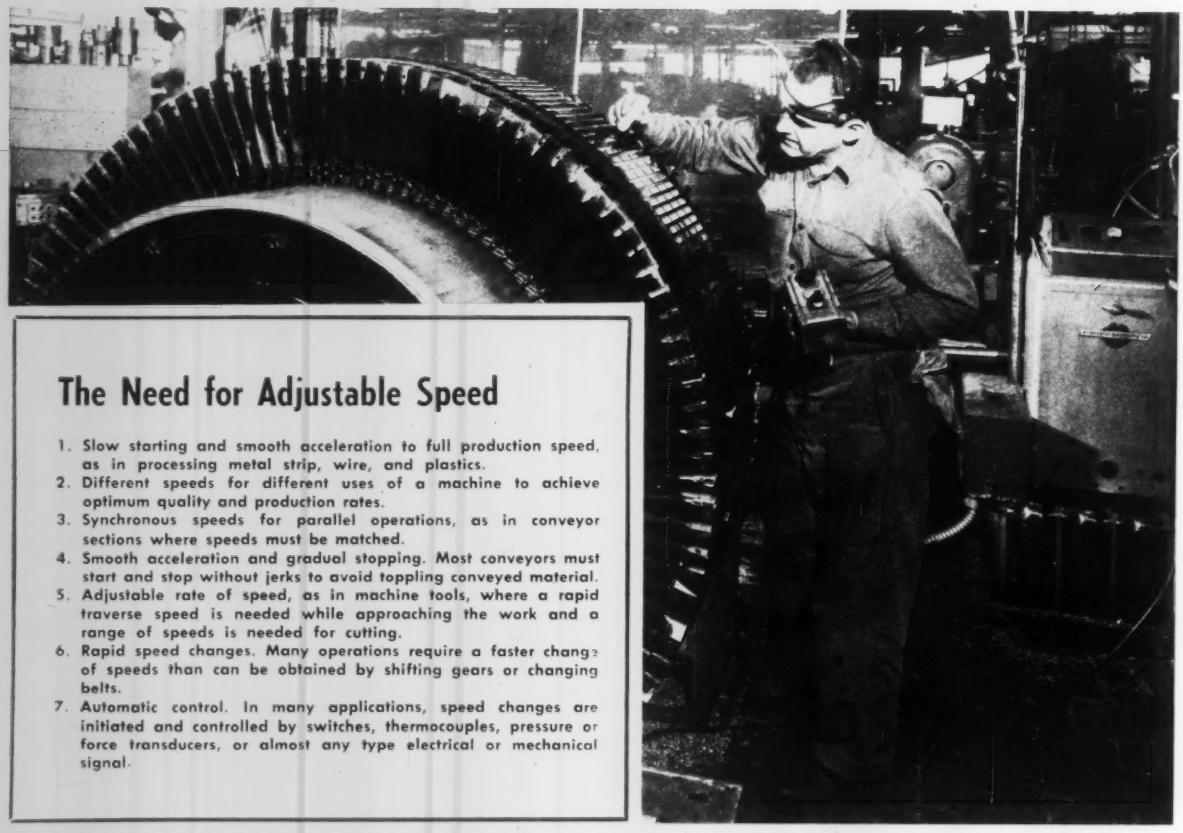
How It's Made—Channeling patterns are machined into a heavy base plate (usually steel). An alloy cladding plate is placed on the channeled side. When brazing material is in place and the edges have been welded shut, the channels are attached to a pump and evacuated. The assembly is heated in a vacuum furnace. Cladding is held firmly to the base by the vacuum in the channeling.

Materials—The Chicago firm says it has tried many metal combinations. The platens for plastic laminating presses were made of air hardening, 60 per cent chrome steel joined to a mild steel base. Many production plates for wind tunnels and reactors are constructed of 5/16 in., Type 405 stainless.

All cladding materials available as solid clad plates can be used for channeled plates. They include: Austenitic stainless 304L, 316L, 321, 347, 318, and 17-7 PH; straight chromium stainless (400 series); and materials like nickel, Inconel, Monel, and the Hastelloys. Titanium, zirconium, bronze, and tantalum will be used in the near future.

Patterns—Channeling inside the plate may be of practically any design. Layouts for large plates are often divided into independent coils to regulate temperature independently in several sections (as in edges or openings) and to reduce pressure drops by using several short sections in place of a long one. Connections are made through drilled and tapped holes in the base metal.

Form and Size — The biggest plate made to date was 60 by 220 in. by 1 19/32 in. Such plates have been rolled to a 12-ft radius in one plane, rolled to the same radius in the opposite direction, then flattened without affecting the bonds or channeling.



The Need for Adjustable Speed

1. Slow starting and smooth acceleration to full production speed, as in processing metal strip, wire, and plastics.
2. Different speeds for different uses of a machine to achieve optimum quality and production rates.
3. Synchronous speeds for parallel operations, as in conveyor sections where speeds must be matched.
4. Smooth acceleration and gradual stopping. Most conveyors must start and stop without jerks to avoid toppling conveyed material.
5. Adjustable rate of speed, as in machine tools, where a rapid traverse speed is needed while approaching the work and a range of speeds is needed for cutting.
6. Rapid speed changes. Many operations require a faster change of speeds than can be obtained by shifting gears or changing belts.
7. Automatic control. In many applications, speed changes are initiated and controlled by switches, thermocouples, pressure or force transducers, or almost any type electrical or mechanical signal.

Varepack is used in building large generator rotors. Operations require frequent starting, stopping, inching, jogging, and turning at various speeds. Operator holds control box; regulating cabinet is in right background

All-AC Drive Answers Need

Alternating current, wound-rotor motor is heart of variable speed system. Thyratron tubes control current in motor secondary, producing smooth speed changes

THE NEED for better adjustable speed, alternating current drives has prompted a new development, called Varepack. It will serve a host of metalworking uses (see box above).

The manufacturer, Electric Products Co., Cleveland, lists these advantages:

- It operates from alternating current.
- It is connected directly to the load.
- Speeds can be selected or changed while the equipment is idle or in motion. It can be done manually or automatically.
- After the speed is selected, it remains constant regardless of fluctuations of load or temperature changes of the equipment.

The System—The drive consists of a wound-rotor induction motor, an operator's control station, and a control cabinet. In the control cabinet are a motor starter, a set of thyratron tubes operating as an impedance control, and a closed-loop regulating system. The regulating system is designed to link motor output to the process function —speed, tension, position, pressure, flow, or other variables.

How It Works—Torque and speed of the wound-rotor motor are controlled by regulating the secondary current with the thyratron tubes. When the motor primary is energized and the speed reference setting is greater than the motor speed, the control circuit allows the gas tubes to send current to the motor secondary. The current produces a field which reacts with the field of the motor primary and produces torque, causing the motor to accelerate. As the motor speed approaches the speed reference setting, the control circuit reduces tube current and motor torque; the motor no longer accelerates but produces only enough torque to drive the load at the required speed.

Engineered System — Charles T. Harmon, sales manager of the Varepack Div., emphasizes that the product is not a standard, off-the-shelf, packaged drive. "It is not the answer to all problems. It is an engineered drive whose regulation, efficiency, range, and speed of acceleration and response can be tailored to the requirements of the application," he explains.

US RUBBER **PowerGrip** "TIMING" BELT

Put reliance on this low-cost belt for your appliance

See the "U. S." exhibit
ASTE Show
Booth 1233

SAVE the "Timing" Belt permits use of a smaller, lower-cost motor

SAVE the "Timing" Belt is reliable—it always works

SAVE with simpler design and fewer units

SAVE it reduces assembly costs

The appliances equipped with PowerGrip "Timing" Belt include:

Air conditioners
Electric typewriters
Lawn mowers
Power tools
Dryers
Washers
Portable tools
Sewing machines
Polishers
Waxers
Sanders

New efficiency with the drive built specifically for appliances

The U. S. PowerGrip "Timing"® Belt has an efficiency of close to 100%. That's why the makers of many kinds of appliances can now combine simplicity of design with split-second response. PowerGrip has no slippage, no take-up—allows short and fixed centers, high ratios. No need for lubrication or housing devices, because there is no metal-to-metal contact. *Quiet!* Handles speeds up to 16,000 f.p.m. or so slow as to be imperceptible to the eye. *Vibrationless!* Simplify and improve your power transmission unit with U.S. PowerGrip "Timing" Belts.

These unique transmission belts are available, along with expert engineering service, at your "U. S." power transmission distributor, or by writing us at Rockefeller Center, New York 20, N. Y. In Canada, Dominion Rubber Co., Ltd.

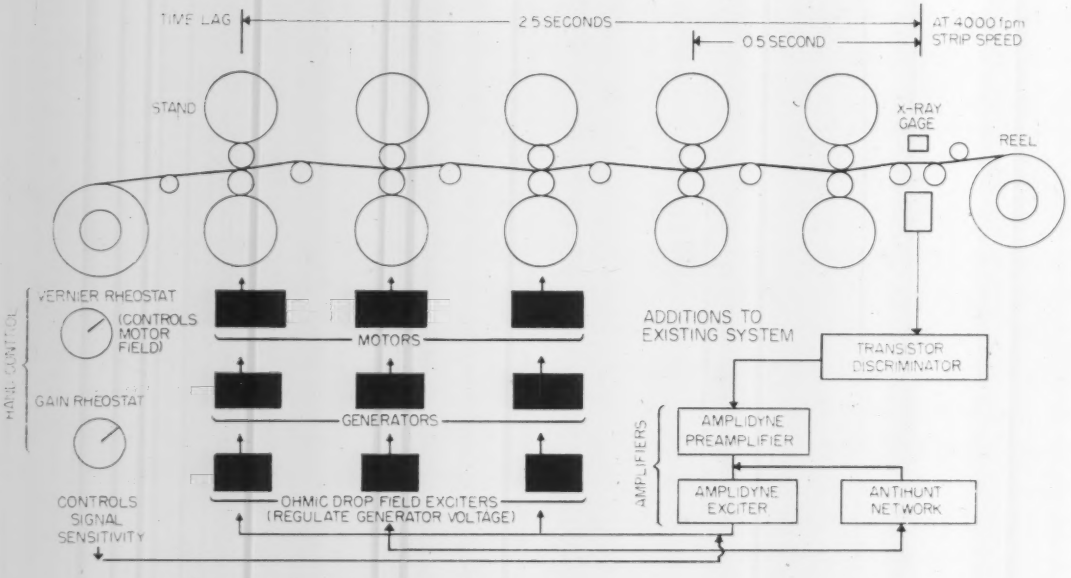
US RUBBER

Mechanical Goods Division

United States Rubber

See things you never saw before. Visit U. S. Rubber's new Exhibit Hall, Rockefeller Center, N. Y.

Strip Gage Control Scheme for J&L's 5-Stand, Cold Reduction Mill



J&L Uses Simplified Gage Control

System it devised does not shoot for the ultimate. It strikes happy medium between a high cost operation and standard manual control by the roller

A COMPROMISE on gage control for a tandem strip mill is paying off at Jones & Laughlin Steel Corp.'s Aliquippa (Pa.) Works. J&L recommends: A system should be simple enough to keep maintenance costs low, but it should do its job better than the roller can.

"We strive to keep the product as close as practical to ordered gage," explains O. C. Gochenour of J&L's maintenance group. "We might obtain a control system that could regulate gage to 1 part in 100,000, but the increase in production cost and maintenance would surely be reflected in product price."

Mr. Gochenour described his company's system (see sketch) at a conference on instrumentation for the iron and steel industry at Pittsburgh.

How It Works—J&L designed its system in 1956 for its 42 in., 5 stand, cold reduction mill in its Tin Plate Dept. at Aliquippa. It replaced a manual system. Corrections are made in ½ second now, vs. 2½ to 6 seconds before.

An x-ray gage feeds its signal into a transistor discriminator. This produces a positive or negative direct current signal, depending on whether the gage is light or heavy, and indicates by the amplitude of the signal how big the deviation is. The signal is amplified in an amplidyne circuit and fed through ohmic drop exciters into the voltage regulators for No. 1, 2, and 3 generators. The voltage of all three generators is changed equally to correct for the deviations measured by the x-ray gage.

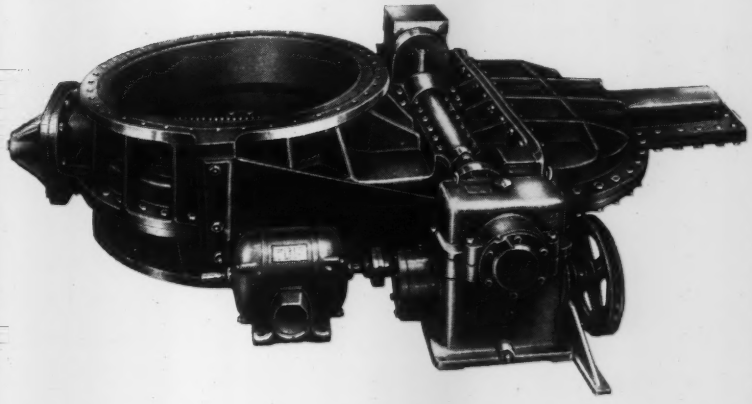
A manual rheostat is provided so the roller can reduce the effectiveness of the signal (adjust the gain) for the lighter gages, and he also uses his vernier rheostat to adjust

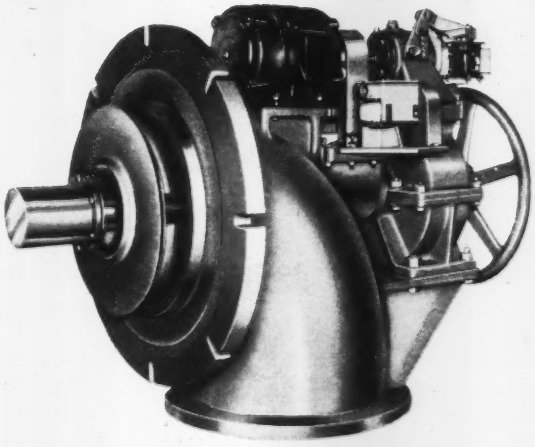
Bailey BLOW-OFF VALVES / COLD BLAST VALVES

Both Motor Driven for Fast, Reliable Operation

Cold Blast Valves

Soundly engineered for dependable service, these valves are used on the cold blast main entering hot blast stoves. Diameters available: 24", 28", 36", 42" and 48". *Write for Bulletin.*





Blow-Off Valves

With a long record for unfailing service, these Bailey Valves relieve pressure in blast furnace hot blast stoves. They are made in 15½" and 18" sizes. *Write for Bulletin.*

These valves also available in Hand-Operated Models

WILLIAM M. Bailey COMPANY
ENGINEERS
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In rotary drilling, pulling a 100-ton, two-mile string of drill pipe subjects the drilling line to the terrific stresses imposed by fast acceleration, shock loads, bending and overwinding on drums. Only wire rope with the highest degree of quality in hardness, strength and fatigue resistance can be used, for toolpushers know that . . .

A quality rope is a safe rope

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For extra strength—buy Wickwire's Double Gray IWRC extra improved plow steel wire rope

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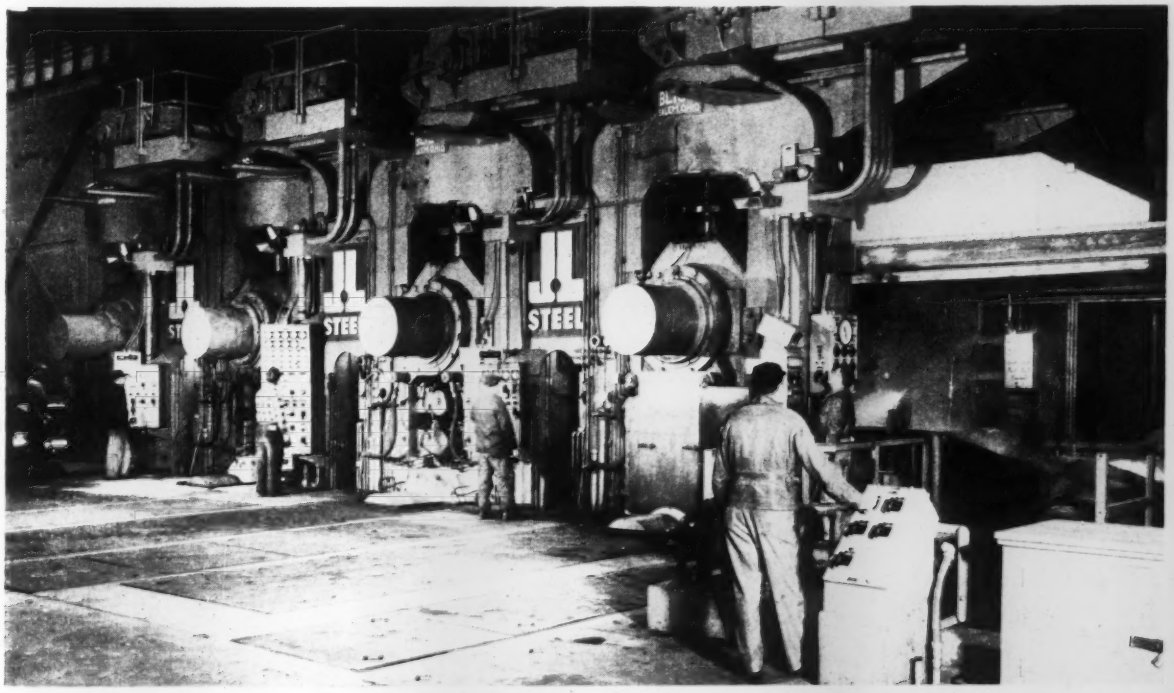

The 77 in., cold reduction mill at J&L's Cleveland Works is equipped with gage control system proved out at Aliquippa Works on a 5-stand mill

the tension between stands No. 1 and 2 by slowing down the stand No. 1 motor. This can be necessary if the gage runs out of range, which could happen if the second of two coils welded together was 0.010 in. thicker in gage than the first. A warning device lets the roller know when the correction has reached 75 per cent of maximum in either direction.

The Problem—Before the control system was installed, strip thickness had been monitored by an x-ray gage mounted on the delivery side of the fifth stand. The roller watched the gage dial and made corrections manually by changing the speed of the No. 1 stand motor with a vernier rheostat which adjusted the motor field. This acted to change strip gage by increasing or decreasing tension on the strip.

It took 2½ to 6 seconds to get back on gage after the roller's eye picked up the off-gage signal. In that time several hundred feet of steel could travel through the mill.

Because of the time lag, it seemed unwise to duplicate the roller's actions with an automatic control which would adjust the motor field, but the principle of adjusting gage by varying tension (rather than screwdown) appeared well worth maintaining.

Four Requirements — J&L engineers decided that an automatic gage control system for the 5-stand mill should meet these qualifications:

1. A single x-ray gage at the delivery side of the last stand. (If placed elsewhere, as between stands No. 1 and 2, it would be harder to maintain and more vulnerable to wrecks. Two gages would double the number of standards to set up, check, and maintain.)

2. Constant speed on stand No. 5. (Stand No. 5 generator and motor are operated fully loaded, and this load determines mill speed. An accelerating load would overload the system and increase strip breakage.)

3. Gage regulation by tension. (Experience showed that tension changes at stands No. 1 and 2 easily corrected for the average 8 mil difference in hot band gage. Position regulators on mill screws would only add complications.)

4. Reaction speed fast enough to follow hot band gage changes. (Response had to be enough faster than manual to improve strip gage quality and justify the system's cost.)

Time Lag Reduced — The long time delay for manual control is reduced two ways: 1. The tension change is produced at a point where transport time to the gage head is about ½ instead of 2½ seconds (the bare minimum for manual control). 2. The speed is changed by regulating generator voltage, which is a faster way to change speed than by regulating the motor field, as is done with conventional control.

Second Unit — J&L recently installed a new, 4 stand, tandem cold mill at its Cleveland Works. Its gage control system is a slightly modified version of the Aliquippa installation. The first two stands are regulated by the gage control to produce the proper tension between stands No. 2 and 3.

According to Mr. Gochenour, the system is so simple that it represents a $50,000 saving over others proposed for the same purpose. Furthermore, he says, it's the only system which will roll welds at full speed.

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CAN GIVE YOUR

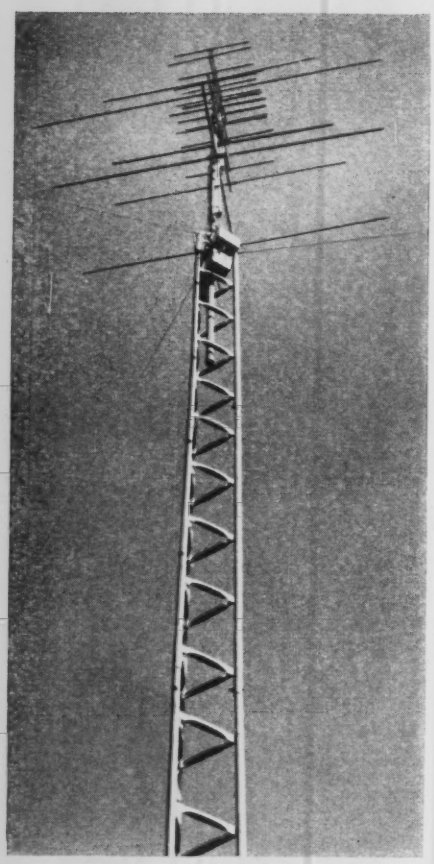
Today, quality tips the scales of competition. Customers demand top value for every dollar. That's why the built-in quality advantages of these special Armco Steels can help your metal products sell easier, faster.

Armco supplies *more than just steel.* It's the "something extra" that products need to stand out in today's highly competitive *quality* market. Here's how:

Every Armco Special Steel offers extra quality advantages because each was especially developed to do jobs that ordinary steels can't do. You can select the specific grade of special steel that delivers the *exact* product features your customers want.

With your product needs in mind, check over these Armco Special Steels. Perhaps one or a combination of them can help give your products an edge over competition. For *complete* information, fill in and mail the coupon or call your nearby Armco Sales Office.

ARMCO STAINLESS STEELS, in sheet, strip, bar, and wire, endow your products with lasting beauty, rugged endurance, and stubborn resistance to corrosion, heat, and wear.

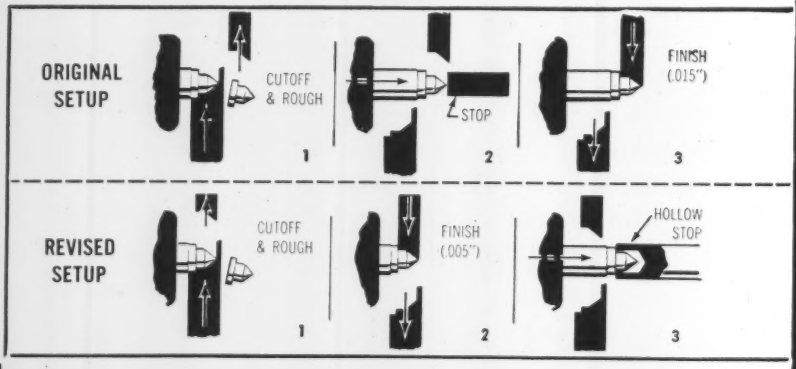


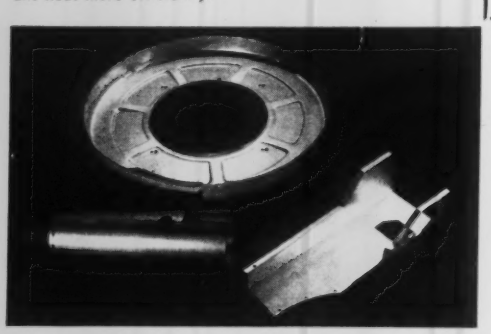
Above: **MUSCULAR MAST**

Customers buy strong, weather-resisting TV antenna masts and towers made of zinc- and aluminum-coated Armco Welded Steel Tubing because they offer ample strength, durability, and lasting good looks.

Below: **FOR DURABLE DRYERS**

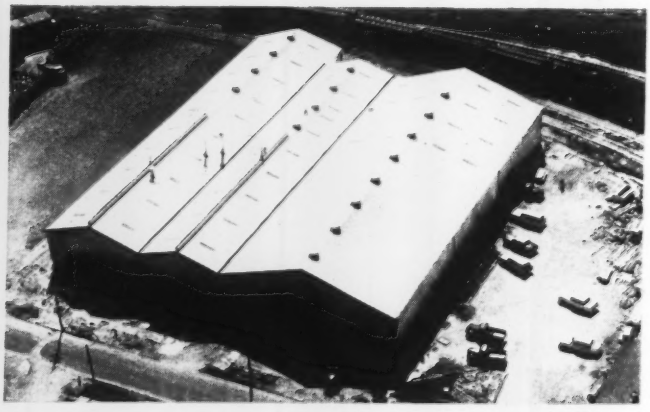
Parts for home laundry dryers made of Armco ALUMINIZED STEEL Type 1 offer important sales features for quality-conscious appliance buyers. They defy heat and corrosion; improve performance by reflecting radiant heat more efficiently.





Right: **MAINTENANCE COST 75% LESS**

"With our building made of Armco ALUMINIZED STEEL, maintenance cost is about 75 per cent less than for other kinds of structures." This building owner's own words point out a strong sales advantage of Armco ALUMINIZED STEEL Type 2 —low maintenance.



Advantages of These Special Armco Steels

PRODUCTS AN EDGE ON COMPETITION

ARMCO ALUMINIZED STEEL TYPE 1, a special hot-dip aluminum-coated steel, is an excellent reflector of radiant heat, defies combinations of heat and corrosion, stays strong.

ARMCO ALUMINIZED STEEL TYPE 2, also hot-dip coated with aluminum, gives outdoor products extra long life. Tests show the aluminum coating outlasts a commercial zinc coating on unpainted galvanized steel sheets 3-to-1 in the atmosphere. It's practically maintenance-free—needs no paint.

ARMCO ZINCGRIP® STEEL assures customers of complete zinc protection in drawn or formed products because its tightly adherent coating holds fast despite severe fabrication. Equally-workable Armco ZINCGRIP PAINTGRIP® gives your products this same zinc protection, plus a special mill-applied phosphate film that takes paint immediately and holds it longer.

ARMCO ENAMELING IRON is a specially processed base metal for porcelain enamel finishes that sell. It's tops in uniformity. Its high purity keeps enameling defects at a minimum. It won't sag at firing temperatures. It's made *only* for porcelain enameling.

ARMCO WELDED STEEL TUBING can give tubular products great strength, as well as the protection of durable coatings of zinc and aluminum.

SPECIAL ARMCO SERVICES

Armco sales engineers and technical specialists will be glad to work with you in selecting the Armco Special Steels that will give your products the quality advantages you want. They will also be happy to consult with your designers. And perhaps they can suggest fabrication methods that will help speed production and keep costs low.

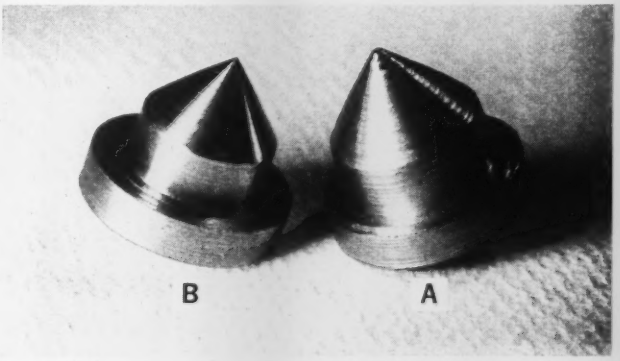
But Armco doesn't stop with technical information. Our marketing specialists stand ready to bolster your product promotion with special aids for sales and marketing.

Why not learn *more* about these special Armco services. Just write us at the address below, or call your Armco Sales Office.

Other Armco Steels for top-quality products include Cold-Rolled PAINTGRIP, High Strength Steels, Electrical Steels, Long Ternes, and high-quality Hot- and Cold-Rolled Steels.

HOW A STUDY BY AN ARMCO STAINLESS MACHINING SPECIALIST PAID OFF—IN IMPROVED FINISH, FASTER PRODUCTION

Drawing (left) shows the simple changes in set-up recommended to a manufacturer of stainless steel needle valve points by an Armco Stainless Machining Specialist. The photo (right) shows the big difference they made. The original valve point (A) had poor finish—no good at all for a leak-proof valve seat. The present product (B) has an excellent finish. What's more, machining time is less.



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Aircraft's Headaches

The industry is faced by a lot of machining problems brought about by the shift to high strength alloys for aircraft and missiles. Here's one of its first reports

THE MACHINING of high strength alloys for aircraft and missiles poses a host of problems, reports the Air Materiel Command in a survey of 31 experts with airframe, engine, missile, and machine tool companies.

Makers of airframes cite these problems—in order of importance:

Milling, high strength steels—End milling and slotting are tough; tool life is practically nil.

Routing, high strength steels and high temperature alloys—The job is practically impossible with hand feeding.

Drilling, high strength alloy sheets—High thrust makes hand drilling impractical; drill life is short.

Grinding, high strength steel, high temperature alloys, and titanium—Conventional methods cause severe surface damage and detrimental residual stresses.

Tapping, high strength steels and high temperature alloys—It's hard to tap 1/4 to 3/8 in. holes; tap life is short.

Turning, high strength and stainless steels, and titanium—No specific problems are cited.

Broaching, stainless and high strength steels—Production rates are low; tool life is poor.

Drilling, high temperature alloys—Small diameter (3/32 to 3/16 in.) deep holes (1 to 3 in.) are difficult, drill breakage is severe.

Milling, high temperature alloys—Side and face milling are slow; tool life is poor.

Grinding, high temperature alloys and titanium—Problems are surface damage and detrimental residual stress conditions.

Here are the problems most troublesome to missilemakers (in order of importance):

Tapping, high strength steels—Blind holes 3/16 to 3/8 in. are a critical production operation. Tap breakage is severe.

Drilling, high temperature alloys—Small diameter (1/8 to 1/4 in.) deep holes (2 to 4 in.) are difficult. Drill life is poor.

Milling, high strength steel—End, slot, and side milling are slow; cutter life is poor; production rates are low.

Grinding, high strength steels and high temperature alloys—Surface damage and detrimental residual stresses result.

Here is how enginemakers rate their problems:

Turning, high strength and stainless steels, and titanium—This is the top problem, but specific difficulties are not cited.

Broaching, stainless and high strength steels—Production rates are low; tool life is poor.

Drilling, high temperature alloys—Small diameter (3/32 to 3/16 in.) deep holes (1 to 3 in.) are difficult. Drill breakage is severe.

Milling, high temperature alloys—Side and face milling are slow. Tool life is poor.

Grinding, high temperature alloys and titanium—Conventional grinding causes surface damage and detrimental residual stresses.

Suggestions

The report points up some future needs in the machining of these metals. Included are: Lower feeds and speeds and greater rigidity on skin and spar millers and profilers, controlled mechanical feeds for drilling, more strength and rigidity in fixtures.

None of the electromachining methods has been widely used in production, says the report, but there is considerable hope that the techniques will help with materials harder than 60Rc.

Tip on Gun Drilling

Special machines aren't always needed. Here's how one company saved $9 on a cast iron part

GUN DRILLING on a turret lathe has become routine at the Hartford Empire Div., plant of Emhart Mfg. Co., Hartford, Conn.

One of ten pieces machined this way is a cast iron part requiring a hole 14 5/8 in. long and 1 1/4 in. in diameter.

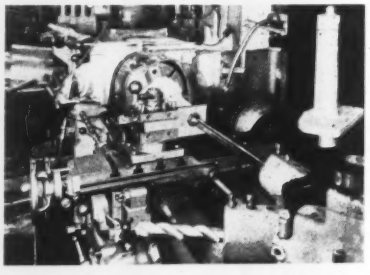
The saving in machining costs on this job is estimated to be at least $9 a part.

How It's Done — The part is chucked in a No. 7A Jones & Lamson turret lathe on the previously turned large diameter (see photo below). The opposite end is turned to fit the bearing of an outboard support. This end is then prepared for gun drilling by spotting, drilling, boring a hole 1 in. deep and 1 1/4 in. in diameter.

The gun drill is used to finish the hole. The piece is drilled at 253 rpm with a feed of 0.005 in. per revolution. The gun drill is made by Madison Industries Inc., Big Rapids, Mich., and has a Kennametal Grade K6 carbide insert tip.

Holes made by gun drilling are straight and round. Scrap losses are less than when it required seven operations to make the holes.

The Old Way—After rough turning the large end and facing the flange, the flange end was chucked and a gun drill was used to drill a 1 7/32 in. hole with a different setup. The hole was reamed to fit a broach and the hole broached to 1 1/4 in. The part was put on an arbor and the large diameter and flange finish turned. Then it was turned around and the hub end faced. A groove for an O-ring was machined on the stub arbor.



Gun drill setup. Starter drill is in foreground. Workpiece is shown in inset

There's More Than Meets The Eye in this 100 Ton Heat

This rushing, molten stream may wind up as a forged steel rotor for a power turbine . . . or a cast steel component for a 2000 ton hydraulic press. The specifications will tell the story.

At Erie Forge & Steel specially trained, experienced metallurgists, chemists and engineers team up to assure you that correct chemical, physical and quality standards are met. The open-hearth melters make many tests of the molten bath to determine exact composition, temperatures, conditions of slag, to control hydrogen and other gases and to eliminate harmful elements in every heat. Quality control begins at the open-hearth and closely follows every operation to the shipping dock. Forging or Casting . . . this "family" influence disciplines the end product to meet exactly what you specify. Your steel forging or casting work is in competent hands here. Consult with us.

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(Advertisement)

A Review of the Phosphate Coatings

Specified for the Protection of Metal Surfaces

By HUGH GEHMAN, Assistant Manager, Product Development Dept., AMERICAN CHEMICAL PAINT COMPANY

Phosphate coatings are protective inorganic finishes that actually change the chemical nature of metal surfaces. The metal reacts with the applied phosphate solution to form a nonmetallic, crystalline coating which serves to:

- **Improve paint adhesion**
- **Provide protection against corrosion**
- **Increase lubricity of friction surfaces**
- **Facilitate mechanical deformation of metals**
- **Decorate—in many instances**

Satisfactory protection of steel, zinc and aluminum surfaces against corrosion, paint peeling and blistering, and hard wear requires precision methods of chemical conversion coating.

Types of Conversion Coatings

There are seven classes of chemical conversion coatings commonly specified and used throughout industry today. They are as follows:

Zinc-iron phosphate (ACP Granodine®). This is the heaviest type of coating (gray in color) used for prepaint treatments on steel, iron and zinc surfaces. The process requires five or six operations: cleaning; rinsing; rust removal, if necessary; coating; rinsing; and a second rinse. Coating weight ranges from 100 to 600 mg per sq. ft.

Medium or large volume production of automobile bodies, appliances, projectiles and cabinets can be handled effectively.

The coating solution improves paint adhesion by forming a crystalline deposit over the metal surface. This deposit is rough, as revealed microscopically, and so offers an ideal gripping surface for paint particles.

Manganese-iron phosphate (ACP Thermoil-Granodine®). This is a heavy black coating used on friction surfaces to prevent galling, scoring and seizing of parts. Typical metal parts treated are pistons, piston rings, gears, cylinder liners, camshafts, tappets and various small arms components.

Iron phosphate (ACP Duridine®). This is a comparatively new process that places a light coating on surfaces for improved paint adhesion. Since cleaning and coating occur in the same bath, it has only three to five stages.

The iron phosphate treatment is a spray process suited for medium to large volume, large or small work. Precleaning is normally unnecessary, an economy factor in its favor.

Products protected by this process are steel or iron fabricated units, such as cabinets, washing machines and refrigerators. Weight of coating is 50 to 100 mg per sq. ft.

Zinc phosphate (ACP Lithoform®). This is a crystalline coating produced on galvanized iron and other zinc surfaces—also cadmium—for improving paint adhesion. The purpose of the coating is to provide a paint-gripping surface and to prevent the reaction between acidic components of the paint and the zinc metal, with the formation of soaps and loss of paint adhesion.

This coating is applied in weights of 75 to 500 mg per sq. ft. There are no limitations on volume or production or on size of products treated. Zinc phosphate coating is used on zinc alloy die castings, zinc or cadmium plated sheet or components, hot dip galvanized stock, and Galvanneal.

Amorphous phosphate (ACP Alodine®). This is a relatively new protective coating for aluminum and aluminum alloys. It may be used in place of anodic deposition for improved paint adhesion and corrosion resistance.

This coating is practical for production in any volume. Coating weight is 100 to 600 mg per sq. ft. Products treated include helmets, belt buckles, aircraft and aircraft parts, bazookas and rocket motors, roofing and siding. Particularly good when aluminum is painted prior to forming.

Zinc-iron phosphate for oil absorption (ACP Permadine®). This is a relatively heavy coating adapted to the retention of rust-inhibiting drying or nondrying oils and waxes on ferrous metal surfaces. The coating is applied to a weight of 1000 to 4000 mg per sq. ft.

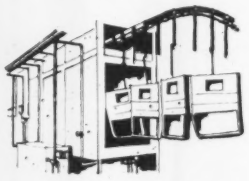
The process is satisfactory for large or small work in any volume—nuts, bolts, hardware, guns, tools, etc.

Zinc-iron phosphate for metal forming (ACP Granodraw®). This is a specialized coating used in conjunction with a suitable lubricant to facilitate the cold mechanical deformation of steel. The coating acts as an anchor for the lubricant throughout drawing, extrusion, and cold forming operations.

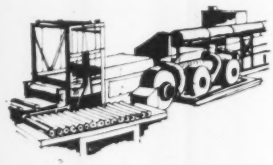
It is a successful treatment for products such as blanks and shells for cold forming, heavy stampings, impact extruded shapes, drawn wire and tube.

For more complete information about any one or all of these chemical conversion coatings, contact an ACP sales representative or write us at Ambler, Pa.

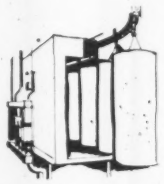
Typical Installations of Phosphate Coating Systems



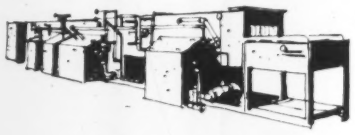
Customer: Truck manufacturer
Problem: Preparing cab parts for painting
Cycle: Phosphate wash; phosphate wash; rinse; chromic acid rinse; dry



Customer: Aluminum screen manufacturer
Problem: Final finish of aluminum shade screen
Cycle: Wash; rinse; phosphate coat; rinse; chromic acid rinse; dry



Customer: Water heater manufacturer
Problem: Preparation of water heater shells for synthetic enameling
Cycle: Phosphate wash; rinse; chromic acid rinse; dry



Customer: Hardware manufacturer
Problem: Preparing hardware parts for painting
Cycle: Wash; rinse; phosphate coat; rinse; chromic acid rinse; dry

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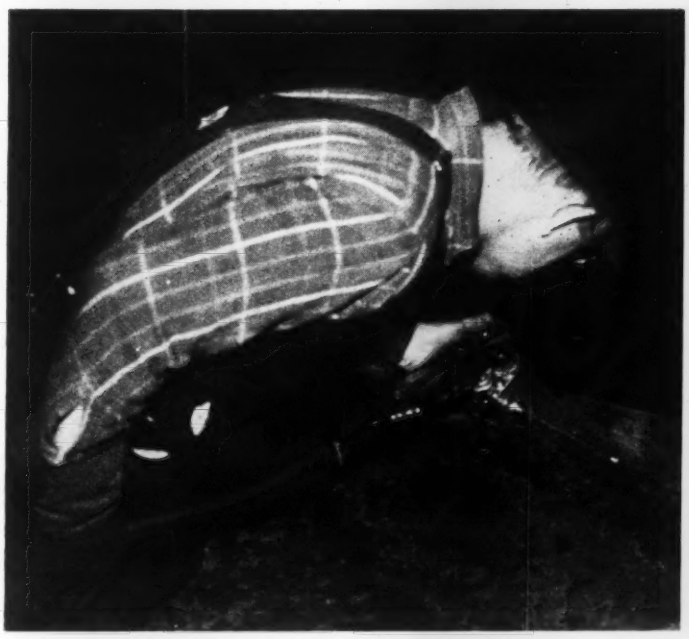


While using the new unit, operator can concentrate on guiding the arc. Other variables are automatic. Wellman Engineering operator welds stiffeners on hoist drum (left)

Submerged Arc Welding Gets Boost

Cost-cutting potential of the process is said to be improved by an updated version of the familiar Squirtwelder. Among other advantages: It's lighter and easier to use

A NEW type semiautomatic welder (the ML-3) promises to broaden the advantages of the submerged arc process. Lincoln Electric Co., Cleveland, says its welder has these advantages:

1. Welding speed is five times faster than that of a comparable iron powder electrode. (Ceiling is 70 ipm at 600 amperes.)

2. The device combines the features of automatic welding with manual guidance.

3. The unit has automatic, metered flux placement to protect weld metal.

4. The gun and control unit are portable.

Case History — Wellman Engineering Co., Cleveland, tried the equipment on a 7-ft cable drum for a large hoist. In comparison with the cost of using stick electrodes, the firm estimates savings were 65 per cent.

Made of 1½-in. plate, the drum has a large hub and 1-in. stiffeners arranged like spokes in a wheel. Stiffeners are welded to the base plate with a ⅜-in. fillet; hub and plate are joined by a continuous ⅝-in. fillet.

Hub and stiffeners are tackwelded and blocked up about 3 ft above the floor. The welder puts a continuous bead around each rib and back to the hub joint. (Current is 550 amperes, 37 volts; speed is 17 ipm.)

Total time for welding and cleaning 30 ft of weld is just under 30 minutes.

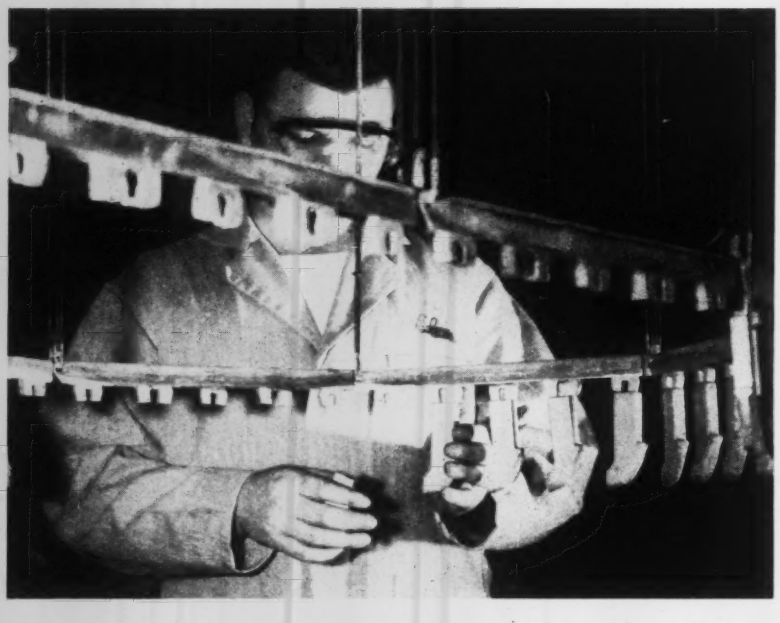
Description—Chris Ramsey, Wellman vice president, thinks the ML-3 is better than the old manual Squirtwelder. He feels its chief advantage is lightness, which reduces operator fatigue. It is limited to welding in the flat position.

The gun has automatic wire and flux feeds. It is moved along the weld by a small, variable speed motor which drives a knurled steel wheel. The operator only adjusts the speed and guides the gun.

The service unit sits on a wheeled base. It holds the wire spool, feed motor, and about 100 lb of flux. Dried, compressed air fluidizes the flux, carrying it freely through a hose to a reservoir on the gun nozzle. In use, flux flows by gravity to the weld.

The device doesn't require fixtures and operates easily on curves and some contours. It will operate on a standard direct current source with a capacity of 1000 amperes.

Cost is under $1000.



Operator attaches a Carboloy mining tool to an Alnico magnet. This size grips up to 8 ounces. After dipping tools in lacquer, conveyor carries them to dryer and packing room

Magnets Cut Conveyor Costs

They solve the problem of handling awkward shapes or those with no projections to grip. Size is no problem. Here's how GE applies them to a paint line

HAVE you ever faced the problem of hanging an "impossible" tool on a conveyor?

Magnets solved such a problem for the Metallurgical Products Dept., General Electric Co., Detroit. Its engineers estimate that savings in conveyor construction came to more than $3500. (That's based on a magnet cost of 80 cents and doesn't include reduced maintenance.)

Construction—GE couldn't conveniently attach its Carboloy mining tools to a conveyor for painting. They come in more than 30 sizes and shapes.

The solution started with the conveyor backbone—it's made from 90 channel bars 12 in. long. They are joined by hinges and suspended from an overhead rail.

Five Alnico V magnets hang freely from each bar. Like poles are placed adjacent to keep them from grabbing each other. GE chose a 1-ounce size which can hold 8-ounce tools. (For special jobs, it uses a 2-ounce magnet which can hold 2 lb.)

Sequence — After inspection, unpainted tools are taken to an overhead conveyor and attached to the magnets. As the line moves, it dips the parts into an aluminum lacquer bath. Farther on, compressed air and circulating hot air dry them.

Tools are removed by hand, inspected, and packaged.

After the tools are removed, the line passes through a hot alkaline solution to strip the lacquer from the magnets. A final hot water rinse completes the cycle.

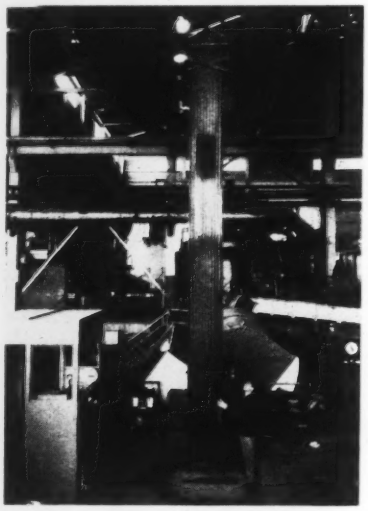
Advance in Copper

Cakes 25 ft long, 36 in. wide are cast continuously. Added benefit: Better quality

COPPER rolling mills have a new way to increase operating efficiency and reduce costs: They can roll more copper per hour with the longer cakes (up to 25 ft long and weighing more than 17,000 lb) now available from American Smelting & Refining Co., Perth Amboy, N. J.

Added advantage: The company is using its new continuous casting operation to produce the cakes. They are sound, dense, and have a uniform surface.

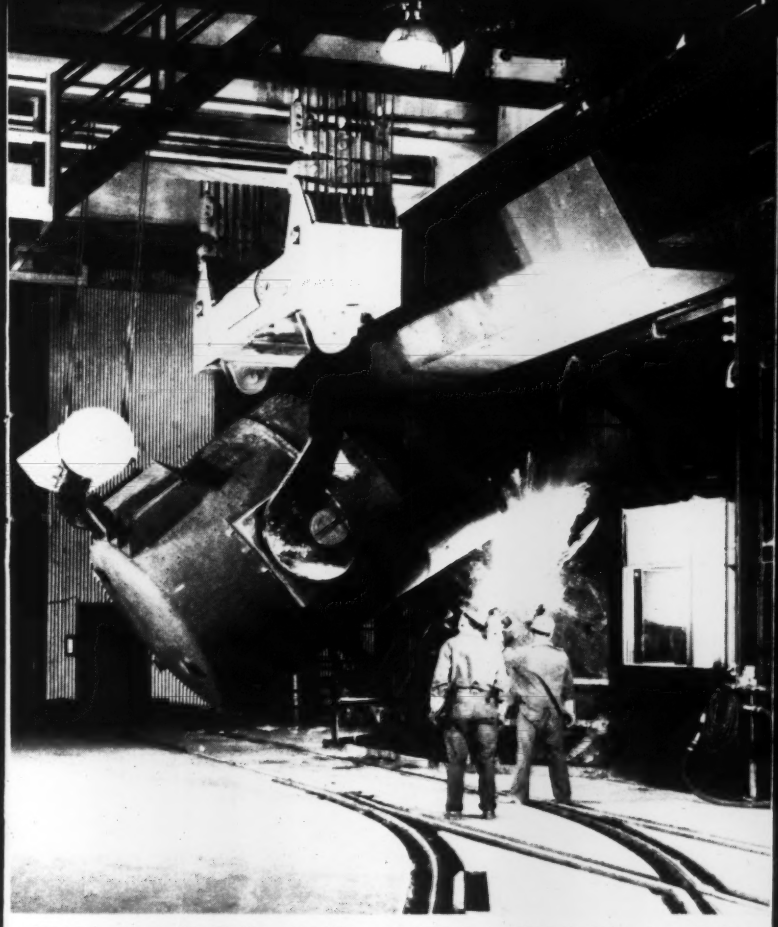
The Process—The technique eliminates batch casting in individual metal molds. It uses a "bottomless" water-cooled graphite mold that is positioned over a hydraulic lift in a pit.



COPPER CAKE
. . . is pulled from mold by crane

Molten copper is poured continuously into the mold, is cooled rapidly, and solidifies as it passes through the mold. The lift goes down as more metal comes in. When casting is completed, the lift pushes the cake out where it's picked up by a crane.

At present, the process is being used to cast tough-pitch copper. With modification, it can be used to produce cakes of oxygen-free, phosphorized, or other special coppers.

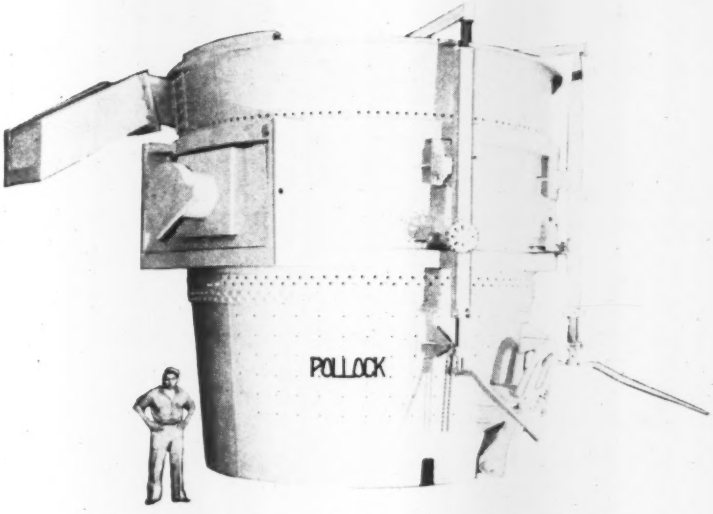


80-ton capacity Pollock ladle pouring iron charge into one of the new basic oxygen furnaces at the Aliquippa Works Division of Jones & Laughlin Steel Corporation.

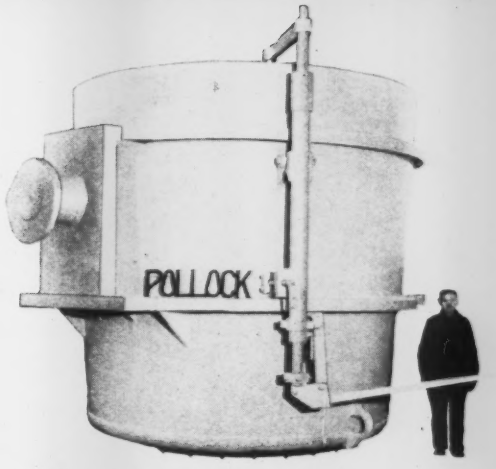
The Industry's STANDARD

POLLOCK LADLES

Pollock ladles, like the one at left, are engineered for the jobs they do. This one was engineered and built for the Jones & Laughlin Steel Corporation, Aliquippa Works Division, to transport molten iron from the mixer ladle to the new basic oxygen process furnace. Its integral spout eliminates the old-fashioned runner used in most pouring operations, and the feet mounted on the ladle base make the ladle free standing. Pollock also built the ladles to receive the steel from the new furnaces. When you plan new facilities or increased capacity in your present plant, consult the Pollock engineers about your ladles. They'll work with you to develop new highs in efficiency and safety.



385-ton capacity open hearth ladle built by Pollock is the world's largest. It stands 17' 3-½" tall.



100-ton capacity all-welded electric furnace ladle by Pollock. All-welded construction cuts ladle weight—increases payload.

THE WILLIAM B. POLLOCK COMPANY
YOUNGSTOWN, OHIO

ASSOCIATED IN GREAT BRITAIN WITH ASHMORE, BENSON, PEASE & CO.

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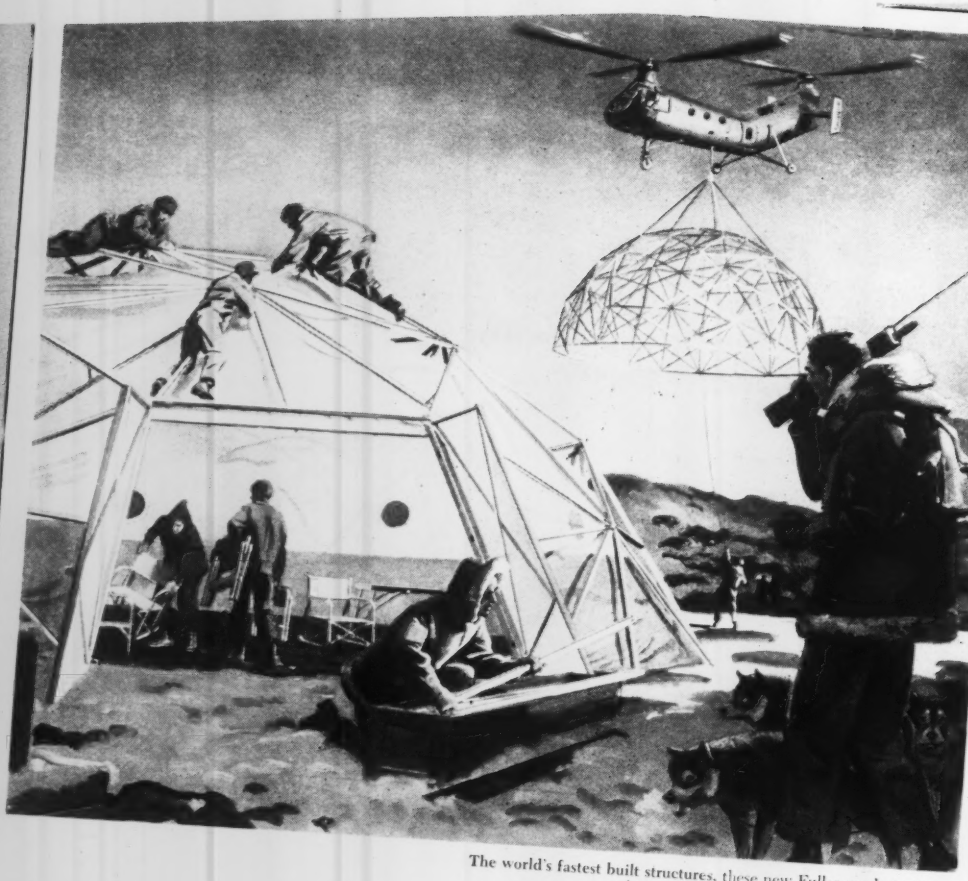
BLAST FURNACES • HOT METAL CARS AND LADLES • CINDER AND SLAG CARS • INGOT MOULD CARS • CHARGING BOX CARS • WELDED OPEN HEARTH LADLES



The world's fastest built structures, these new Fuller geodesic domes rely on aluminum's unique lightness and strength

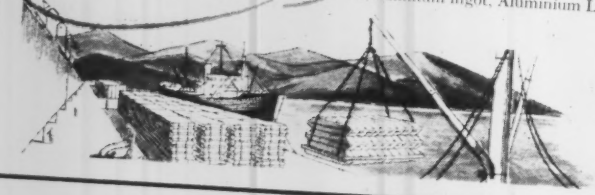
House 20 men in 20 minutes...anywhere!

Want to house a gang at summer camp? . . . put a whole garden in a greenhouse? . . . enclose a swimming pool? Try an inexpensive geodesic dome of translucent plastic and "care-free" aluminum. They're miraculously strong, yet have no central supports.

Aluminum is ideal in so many roles that a steady flow of this metal is now essential to our economy. Fortunately, neighboring Canada is one of the world's most dependable sources of aluminum. Why? Because in Canada's river-rich northland over 1½ million kilowatts of hydroelectric power have been harnessed solely for aluminum smelting, *an electrolytic process consuming over 18,000 kw hours per ton.*

The world's second largest producer of aluminum ingot, Aluminium Limited, sells no consumer products in the United States. It concentrates, instead, on supplying hundreds of independent U.S. fabricators with a steady, dependable flow of raw material essential to business, to industry and defense.

Aluminium Limited, Montreal: *Canada's independent producer of aluminum ingot for U.S. industries.*



Aluminum from Canada

Aluminum plus imagination made this possible!

This portable shelter contains two essential ingredients: aluminum's lightweight strength . . . and skilled design engineering. Are you making the most of aluminum's unique properties in your manufacturing operations?

Aluminium Limited *Sales, Inc.*

630 Fifth Avenue, New York 20, N.Y., Cleveland, Chicago, Los Angeles, Detroit, Atlanta, Buenos Aires, São Paulo

Controls Up Output

Static control logic elements reduce maintenance downtime on an assembly machine

STATIC CONTROL is expected to bring about a 10 to 15 per cent increase in production on a sparkplug assembly machine at General Motors' AC Spark Plug Div. plant, Flint, Mich. The secret: Reduced downtime.

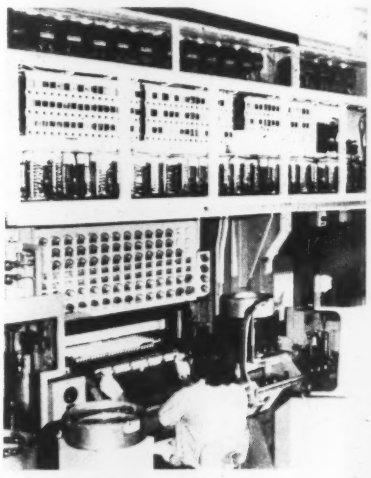
"With conventional controls, downtime on a machine begins after about a year of operation. After a year and a half to two years, all controls have to be replaced," state AC engineers. "We expect to avoid this problem with static controls," they explain.

Others Planned—The plant now has three different static control panels in use, and other panels are being designed for machines on which maintenance of conventional controls has posed a problem.

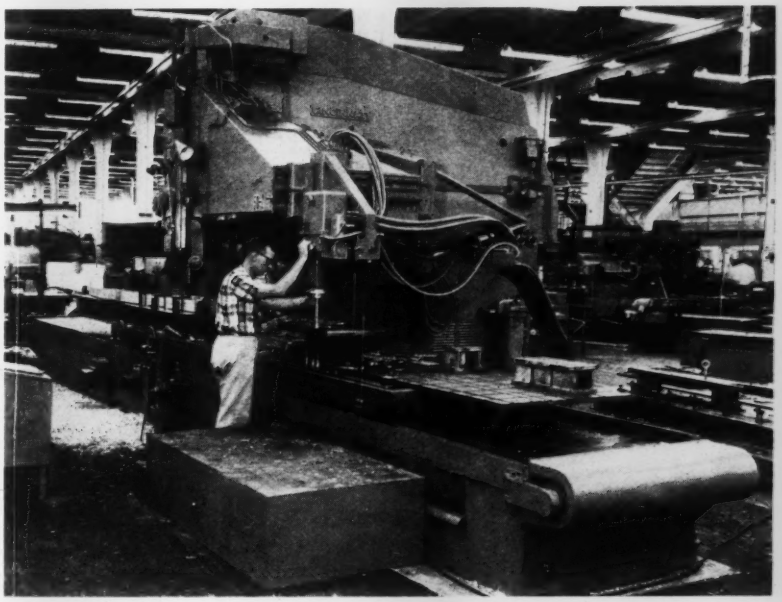
Built by Helfrecht Machine Co., Saginaw, Mich., the sparkplug assembly machine uses a control panel composed of 127 General Electric static control logic elements.

Static elements have no moving parts. Life expectancy is long because the parts are not subject to wear and erosion.

A quick and accurate means of checking machine operation is provided by monitor light attached to the plug-in elements. The plug-in design makes maintenance simple.



Operator loads base and ceramic cores on sparkplug assembly machine. Static control panel with logic elements can be seen on top of machine



This is one of the Cincinnati Hydro-Tel mills Martin recently installed. Table size is 45 by 208 in. Tracer guides cutter automatically. Used for aluminum, machine also handles steel

Mill Handles Big Plane Parts

Increasing size of aircraft creates need for larger production equipment, says planemaker. Several mills like the one above make parts for Martin's P6M Seamaster

THE size of today's aircraft often forces planemakers to install larger equipment, says Martin Co., Baltimore.

It points to its own example: Several Cincinnati Hydro-Tel mills like the one in the illustration were recently installed. They are said to be among the largest in this country.

The machines automatically mill aluminum details for the Martin P6M Seamaster. They can also machine steel.

Feature—The head of one of the machines has a variable angle cutter which can operate at 20 rather than 90 degrees, the conventional setting. It is said to be the first machine so equipped.

A tracer control improves accuracy and efficiency. It can be adjusted for tolerances of as little as 0.005 in.

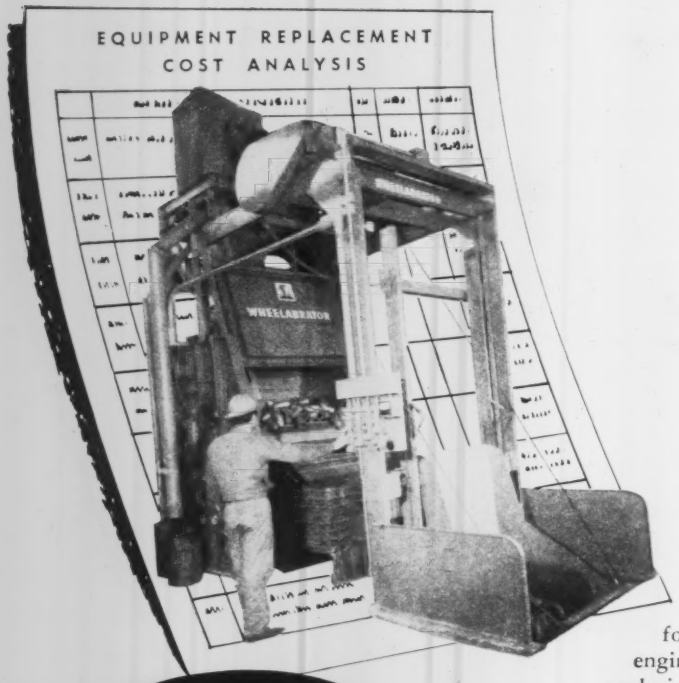
Description — The tables will travel longitudinally 168 in. Cross-ram travel is 48 in. Tables are 45 by 208 in., with a maximum throat of 60 in. Vertical spindle travel is 24 in. There are 20 speeds, ranging from 16 to 1600 rpm.

The bed table unit has a rack and double pinion feed box. Feed rates for table and cross slide are infinitely variable from 1 to 25 ipm for tracing cuts and up to 50 ipm for straight milling cuts.

The table and cross slide can be rapidly traversed at 120 ipm.

Need—Such equipment, Martin points out, provides greater latitude of design and lightens aircraft construction. Combining several parts into a single machining eliminates fasteners, rivets, and gussets.

Are You Paying for Blast Equipment *You Don't Have?*



SAVINGS $16,695.00

SAVINGS $11,000.00

SAVINGS $10,000.00

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Cost Analysis Forecasts Savings in Cleaning Costs

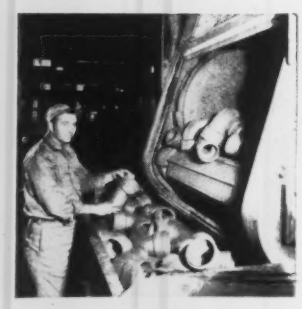
It may be that your blast equipment is giving you virtually the same performance it provided when it was brand new. But the cost of operating older machines, when newer, more efficient equipment is available, usually far exceeds the cost of purchasing and operating the more modern equipment.

A realistic cost evaluation of your cleaning operations may reveal that you, too, are paying for equipment you don't have. Wheelabrator engineers, using the most modern methods for analyzing the cost of equipment replacement, will assist you in making such a study. Similar replacement studies have revealed savings in one case of $16,695 a year by replacing two blast machines with a Super Tumblast. In another study, annual savings of $13,221 were shown.

Call in a Wheelabrator engineer today. Let him prove to you that Wheelabrator airless blast equipment will pay for itself through savings in operating costs, increased cleaning capacity, reduced manpower, and greatly reduced maintenance.

OPERATING COSTS AND CLEANING TIME SLASHED 50%

Both labor and operating costs were cut in half at the Wahkonsa Foundry Company with the installation of a Wheelabrator Super Tumblast for cleaning cast iron soil pipe fittings. Loads are cleaned in 5 minutes.



SAVES 22 MAN-HOURS DAILY

At Canton Malleable Iron Company two standard blast mills were operated two full shifts daily, requiring 32 man-hours of operator time. A Super Tumblast now does the same volume of work in only 10 man-hours. Castings formerly requiring 30 to 45 minutes are now cleaned in 9 minutes.

Write today for new Handbook of Ideas on Cleaning and Finishing. Ask for Catalog No. 143-D.

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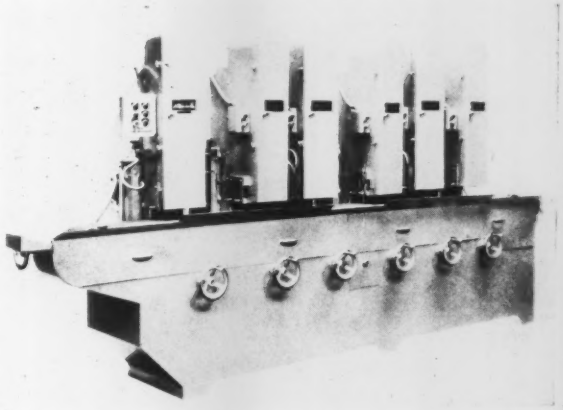
WHERE PIONEERING LEADERSHIP INSURES PERFORMANCE

WORLD'S LARGEST MANUFACTURER OF AIRLESS BLAST CLEANING EQUIPMENT AND STEEL ABRASIVES

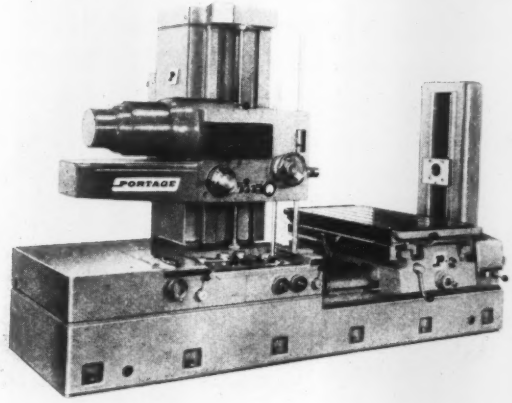
Conveyor-Type Belt Grinder Does Six Operations in One Pass

Model 680-6 abrasive belt unit handles high volume flat surfacing on ferrous and nonferrous metals, and other materials. It is equipped with six adjustable grinding heads. By using a series of abrasive belts, parts can be rough ground, sized, and finished to a fine finish in one continuous operation. For parts requiring heavy stock removal, identical belts can be used on each head to multiply the production rate. The unit is designed for both wet and dry grinding.

Maximum piece capacity is 5 in. high, 5½ in. wide, and any length. The conveyor belt is 7 in. wide and 268 in. long. Its speed is from 2 to 25 ft per minute. The unit contains two coolant pumps. The grinding heads have 7½-hp drive units. *Write*: Engelberg Huller Co., 831 W. Fayette St., Syracuse 4, N. Y. *Phone*: Granite 8-3195



Horizontal Boring Mill Built for Economical Work



This milling, drilling, and boring machine is suitable for tool production, or roughing work. It features fast positioning and handling for long or short run lots. Power, spindle, and variable feed provide the best combinations for operations with large or small cutting tools.

Separate spindle drive and feed motors offer maximum power to cutting tools at all speeds and provide flexibility of feed motions for economical tooling. Saddle feed range is from 0.03 to 30 ipm.

Spindle diameter is 3 in., and feed travel is 24 in. Spindle speed range is from 26 to 1535 rpm. The rapid traverse on head, table, and saddle is 90 ipm. Over-all dimensions are 10 ft 7 in. by 4 ft 8 in. by 7 ft 2 in. *Write*: Portage Machine Co., 1025 Sweitzer Ave., Akron 11, Ohio. *Phone*: Blackstone 3-7191

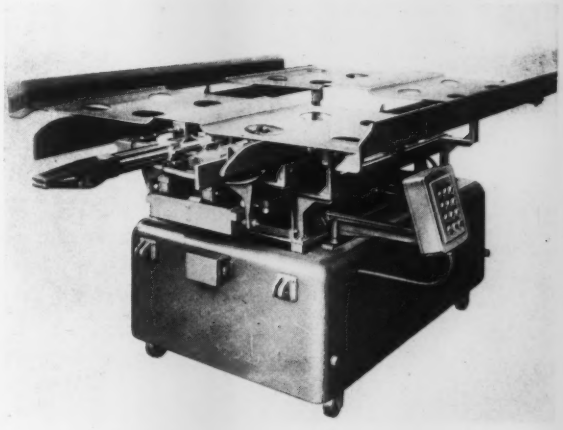
Transfer Units Automate Standard Punch Press Lines

These standardized Press-Matic units automatically load and unload parts in and out of dies and transfer parts between presses.

The machines are portable, floor type, and self-contained. They are equipped with quick air and electrical connectors.

The units are placed behind or in front of standard presses. They can move parts in or out of several dies on the same press. Dies can be unloaded on the upstroke of a press and reloaded on the downstroke for maximum production. Tooling can be adjusted to handle different parts on the same line.

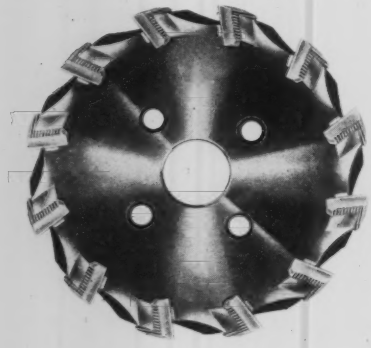
Electrical interlocks and built-in safety features prevent the machines from completing a cycle if a die fails to release a part. *Write*: Die & Automation Inc., 5353 Dixie Highway, Hamilton, Ohio. *Phone*: Twinbrook 2-4581



NEW PRODUCTS and equipment

Blade Milling Cutters

This new line of inserted, high speed steel, blade milling cutters features generous size blades and ample length for deep shoulder cutting operations. These features permit economical grinding of radiuses on blades of the sizes normally encountered in light metal machining.

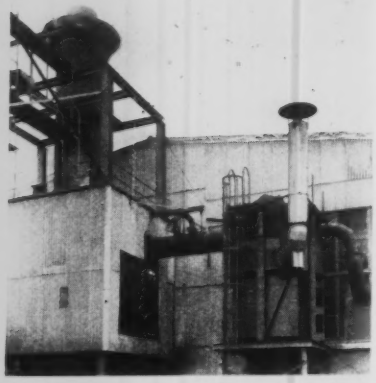


Chip spaces are polished to facilitate chip flow. The cutters are available with either a No. 50 NS drive for mounting the cutter directly to the machine spindle or a flat back drive for mounting on centering plugs.

Cutters are made to order with diameters ranging from 8 to 16 in. Width remains constant at 2 in. *Write*: Goddard & Goddard Co., 12280 Burt Rd., Detroit 23, Mich. *Phone*: Kenwood 1-3000

Improves Cupola Heating

This line of all metallic, hot blast preheaters for foundries lowers initial investment and maintenance costs by eliminating refractory materials. The unit makes possible higher pouring temperatures, fast heatup, and smaller coke demand in the cupola.

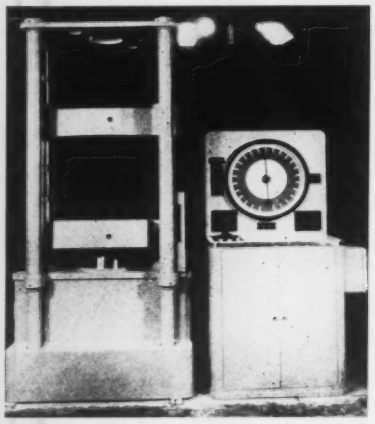


The preheater burner is automatically controlled, operates on gas or oil, and is equipped with a combustion air blower. The heater is of a modular design; any number of units can be interconnected to increase capacity. *Write*: Brown Thermal Development Co., subsidiary of Brown Fintube Co., Elyria, Ohio. *Phone*: Fairfax 3-3291

Testing Machine

This large, single screw mechanical tester can apply tension and compression or alternating loads to the unit under test. The machine features positive head positioning, constant or variable head speed, direct reversibility for tension or compression, and the ability to cycle both load and strain.

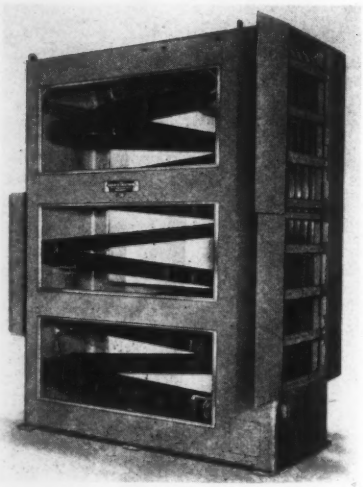
Because of a single preloaded ball and screw mechanism, drive power needed is less than ordinary: The machine is powered by a 5-hp motor. Standard testing space is 30



by 48 in. Load range is from 30 to 150,000 lb. *Write*: Electronics and Instrumentation Div., Baldwin-Lima-Hamilton Corp., Waltham 54, Mass. *Phone*: Twinbrook 4-6700

Feeder Counts Parts

This demand feed storage unit, designed for use in automated processing lines, handles rolling parts. It is constructed of $\frac{1}{4}$-in. steel welded into a combination frame and shell. Tracks and elbows are made from die-stamped steel. A bypass track permits direct passage of parts through the unit.



Capacity ranges from 1500 parts $2\frac{1}{8}$ in. in diameter by $1\frac{1}{8}$ in. wide to 3000 parts $1\frac{3}{8}$ in. in diameter by $1\frac{1}{8}$ in. wide. Built-in counters provide a running inventory. Total weight is 4000 lb and floor space required is 3 by 8 ft. *Write*: Gear-O-Mation Div., Michigan Tool Co., 7173 E. McNichols Rd., Detroit 12, Mich. *Phone*: Twinbrook 1-3111

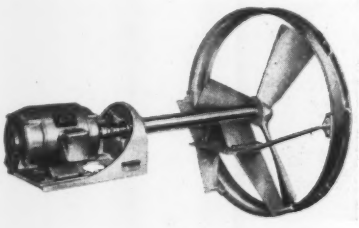
Graphite-Silicone Paint

Parts coated with this paint (black or aluminum) can be heated to 1000° F and dropped into icy water without danger of the paint cracking, peeling, flaking, or bubbling. It is called Thermocone. *Write*: Joseph Dixon Crucible Co., 167 Wayne St., Jersey City 3, N. J. *Phone*: Delaware 3-3000

Fan Shaft Lengthened

This line of axial flow extension shaft fans is designed for installations requiring isolation of the fan motor from the air stream. For corrosive exhausts, special corrosion resistant coatings for the fan and extension tubes are applied at the factory.

Type CE fans are available in multiblade designs made of cast alu-



Here at The House of Stainless, we provide a metallurgical service that goes far beyond helping you select the type of stainless best suited to your application.

We can help you determine how best to work with the stainless selected. How best to handle such operations as machining, welding, soldering, drawing, forming, spinning, or the many other facets of fabrication.

This help can include assistance in adapting your present equipment for handling stainless steel as well as counsel on set-up and operating procedures.

It can mean help in tool design for long life and economical production—plus assuring finished parts to meet your quality standards.

Important, too, is the know-how and experience available to you in exploring possible avenues for maximum economies both in fabrication and finished product.

In short, Metallurgical Service at The House of Stainless can be as broad and inclusive as your needs demand. *And it's available to you at any time without charge.*

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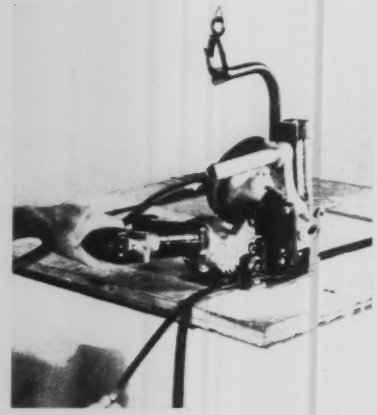
minum-magnesium alloy with diameters to 60 in. and air deliveries to 79,000 cfm. Extension shafts range from 16 to 66 in. in length. *Write*: Propellair Div., Robbins & Myers Inc., Springfield, Ohio. *Phone*: Fairfax 3-6461

Power Strapping Tool

The A4 pneumatic Steelstrapper combines tensioning, sealing, and cutting. The unit will work in any position. Tension is adjustable. The unit must go through its complete cycle before it will cut the strap. The power sealing lever is in the handle. Feed is from a magazine that holds 100 seals.



Models are available that handle strapping from ½ to ¾ in. wide. All units will handle straps ranging from 0.015 to 0.023 in. *Write*: Acme Steel Co., 135th Street and Perry Avenue, Chicago 27, Ill. *Phone*: Interocean 8-9500

Prevents Metal Contacts

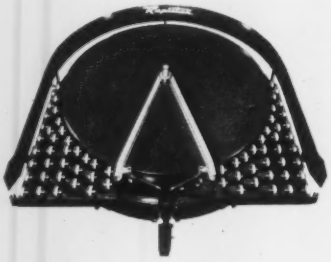
This lubricant and rust preventive eliminates or reduces sticking and toxic fumes. It stays on the metal, insuring complete lubrication.

It can be used in diecasting, forging, drawing, and stamping in the place of oils, grease, graphite, silicones, and white lead. It doesn't clog spray systems, affect metal, or personnel.

It remains on work surfaces up to 3000° F and can be removed with water, alkaline solutions, or solvents. Main ingredients: Extreme pressure lubricants plus metal in soluble form. It does not contain silicones, manganese, copper, graphite, or suspended matter. *Write*: Harry Miller Corp., Fourth and Bristol Streets, Philadelphia 40, Pa. *Phone*: Davenport 4-4000

Power Turntable

Telescoping legs permit the top of this table to be adjusted from 24 to 39 in. above the floor. It is supported at four points by 6-in. di-



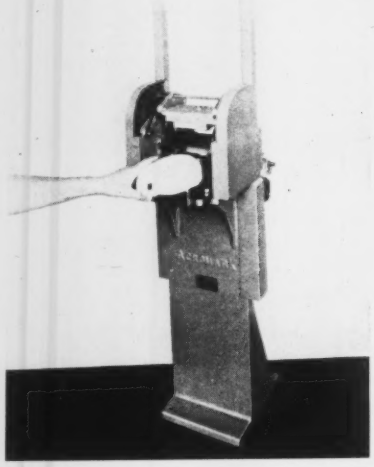
ameter, rubber tired wheels. Available in diameters of 4, 5, and 6 ft, it can be positioned to allow up to 180 degrees of transfer.

The two larger tables are ¼-in. steel, die formed plate. The 4-ft unit is 3/16-in. plate. *Write*: Rapids-Standard Co. Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.

Color Filling, Printing

Acroprinter, Model 401-A, applies color to depressed or sunken cavity letters and designs. It also applies color to raised panels, faces of raised letters and designs, or combinations. Impression controls are automatic.

It is a platen type printing machine mounted 32 in. above the floor. With cast iron base, it weighs



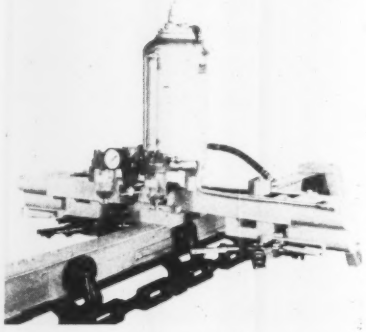
135 lb. Three sizes are available. *Write*: Acromark Co., 398 Morrell St., Elizabeth, N. J. *Phone*: Elizabeth 2-6500

Coating Tough, but Flexible

Charcote CIC "21," a corrosion inhibiting coating, uses a Du Pont Neoprene base, has a built-in primer. Features are economy; ease of application; resistance to weathering, chemical fumes, salt spray, and corrosion creep. It has a hard, tough, yet flexible film that resists impact and abrasion. It adheres to steel, bronze, aluminum, stainless steel, and galvanized iron. *Write*: Charleston Rubber Co., Stark Industrial Park, Charleston, S. C. *Phone*: Sherwood 4-7434

Air Cushion Saves Nozzle

Two power sources are required for this line of trolley lubricators: An air line, and the moving conveyor. Spacing of conveyor trolleys



may be inches or yards apart. A built-in air cushion allows a bent trolley to pass without breaking the nozzle.

Automatic lubricators are available in eight different models for either oil or grease. *Write*: Olsen Mfg. Co., 638 S. Rochester Rd., Clawson, Mich. *Phone*: Lincoln 4-8338

Miller Is Automatic

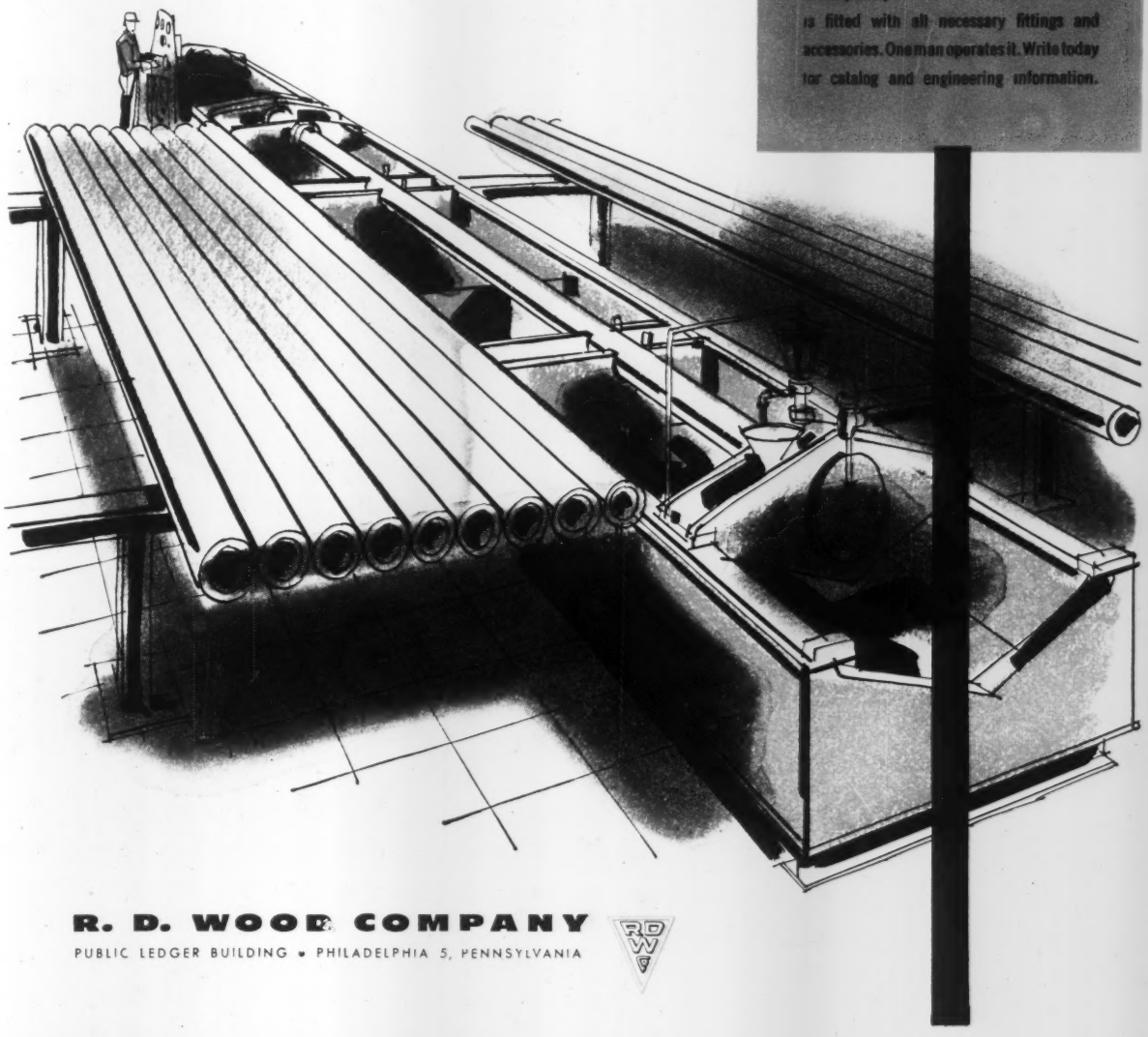
Wardwell No. 100F saw tooth milling and grinding machine is hydraulically operated. This unit automatically performs multiple operations.

It indexes a gang of saws (up to 14 in. in diameter and in gangs up to 7 in. long), one row of teeth at a time. It will take 112 saws, 1/16

Apply your special requirements to basic R. D. Wood press designs

Here's the sensible, economical way to design your own press. Working with numerous *basic* models, R. D. Wood engineers apply *your* specifications and modifications to produce the press precisely suited to your needs. No starting from scratch. No needless delays in construction. No paying for more design than you need. You're sure of quality too. For every Wood press is constructed of selected materials by master craftsmen. Here is your assurance of precise operation and long, trouble-free performance. When you need a press, bring your specifications to Wood.

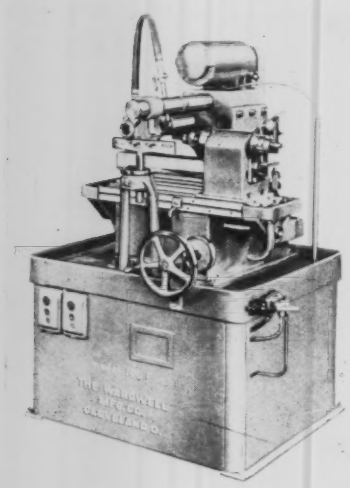
R. D. Wood Hydrostatic Tube Testing Machine for tubes of 4½" to 12" diameter nominal sizes and in maximum lengths of 35'-0" at hydrostatic test pressures from 700 to 1500 psi. Resistance head can be adjusted for testing shorter lengths. Unit is completely self-contained. The tube tester is fitted with all necessary fittings and accessories. One man operates it. Write today for catalog and engineering information.



R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

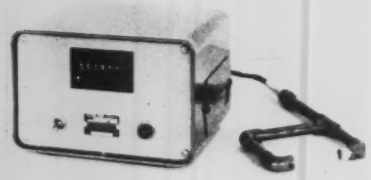
NEW PRODUCTS and equipment



in. thick, in one setting. *Write*: Wardwell Mfg. Co., 3805 Ridge Rd., Cleveland 9, Ohio. *Phone*: Melrose 1-3164

Electronic Counters

Model C Count-Pak is a complete unit consisting of a high speed magnetic counter in a case, combined with a light source and a photocell.



The photocell is small and can be made in any configuration needed. Cell and light sources are permanently assembled so that vibration will not jar them out of focus.

Pulses as short as 0.0002 second will actuate the device. Rated speed is 3000 counts a minute with reasonable accuracy. *Write*: Electronic Controls Div., Veeder-Root Inc., Hartford 2, Conn. *Phone*: Jackson 7-7201

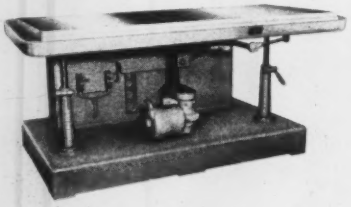
Feeds Parts Faster

These bowl type part feeders come in a range of sizes from 5 to 36 in. in diameter. They are available in cast aluminum, cascade or straight wall fabricated stainless, or cold-rolled steel. Bowls are of a quick-

change design for users who interchange bowls to handle different parts on the same drive units. *Write*: Syntron Co., 370 Lexington Ave., Homer City, Pa. *Phone*: 9-8011

Power Table

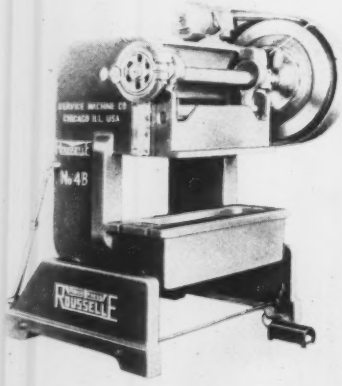
This unit is power elevated for fast up and down movement.



One lever controls all table movements and lowers, raises, and locks the table in place. Limit switches control top and bottom travel limits. A gear motor provides the power. *Write*: Edlund Machinery Co., 44 Huntington St., Cortland, N. Y.

Punch Press

No. 4-B is a 40 ton, double crank, open back, inclinable press. It features extra large die area and an



electrically controlled, air operated, friction clutch.

The bed area is 16 by 48 in.; face of ram, 14 by 36 in.; die space, 12 in.; clearance between housings, 3 ft. *Write*: Service Machine Co., 2310 W. 78th St., Chicago, Ill. *Phone*: Prospect 8-1200

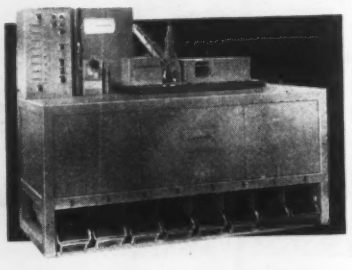
Portable Electroplater

This compact unit for precision plating measures 34 by 28 by 33 in. It permits mass production barrel or rack plating with any cold alkaline solution, and most acid plating solutions.

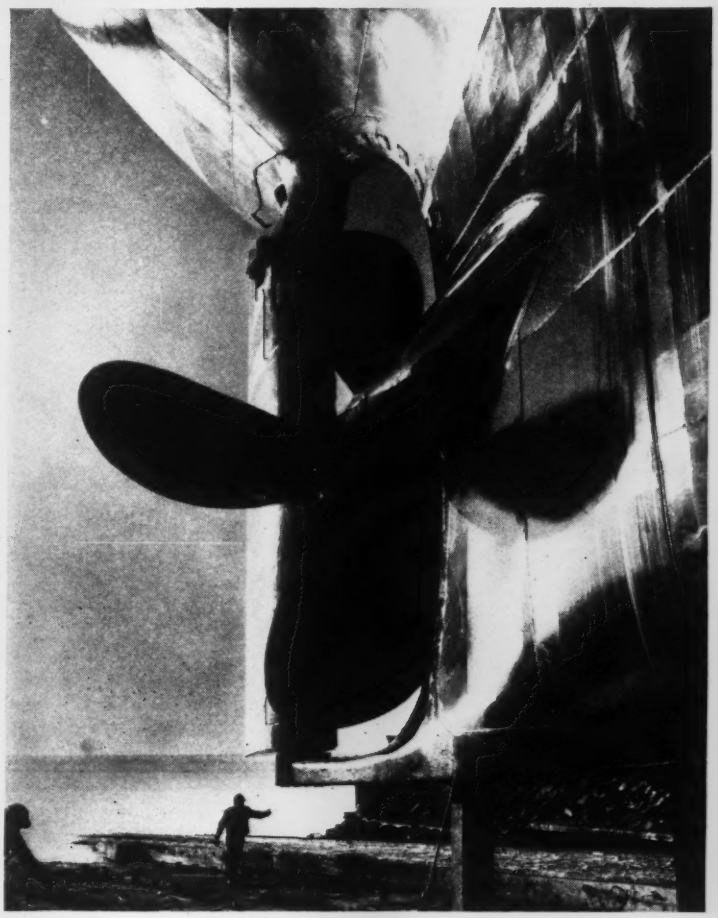
The units are completely automatic. In operation, the solution is continuously drawn off at the bottom of the tank, circulated through the pump and built-in filter, and returned to the tank under pressure. *Write*: Sel-Rex Corp., Nutley, N. J. *Phone*: Nutley 2-5200

Gear Inspection Unit

This machine automatically gages, sorts, and counts gears and nongear parts into eight size categories at up to 1200 parts an hour. Gaging limits are easily and accurately changed and production speed is adjustable. The unit operates on



Heavy sections like rudder posts and propeller blades can be gamma ray inspected with ⅓ shorter exposure—and welded seams can be radiographed more rapidly with available portable or low kv x-ray equipment—when Kodak Industrial X-ray Film Type KK is used.



. . . cut exposure time 1/3 with New Kodak Industrial X-ray Film TYPE KK

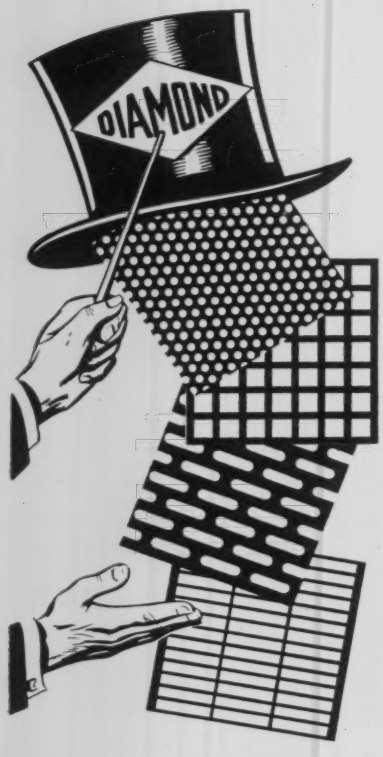
Where heavier sections are to be radiographed or where the output of available x-ray or gamma ray sources is limited, Kodak's new Industrial X-ray Film Type KK is the film to use.

This film shows as much as 50% increase in speed over the well-known Type K Film. It means more work can be done—that exposures can be cut by a third. And those who have tried Type KK tell us that its higher contrast, offsetting a slight increase in graininess, provides improved radiographic sensitivity.

To learn how Kodak Industrial X-ray Film Type KK can extend the service of your present radiographic equipment, get in touch with your x-ray dealer or Kodak Technical Representative.

EASTMAN KODAK COMPANY
***X-ray Division*, Rochester 4, N.Y.**

Kodak
TRADE MARK



Top-Hat Quality
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Perforated Metal

The popular Diamond Perforated-metal patterns shown above are only a few of the many illustrated and described in our 32-page Catalog No. 39. All of these standard patterns are available in a wide range of unit-opening sizes and we are always equally pleased to quote on original designs of any type or size.

Catalog 39 also illustrates and describes our high-quality lines of *Ornamental Cane*, Perforated-Metal Sheets for Accoustical installations and Heavy-Duty Architectural Grilles. Write, today, for a free copy.

Correspondence is especially invited regarding ANY requirement for perforated-metal panels or parts. We are equipped to fabricate special sections to any desired extent and welcome opportunities to make money-saving suggestions.

DIAMOND MFG. CO.
WYOMING WILKES-BARRE AREA **PA.**

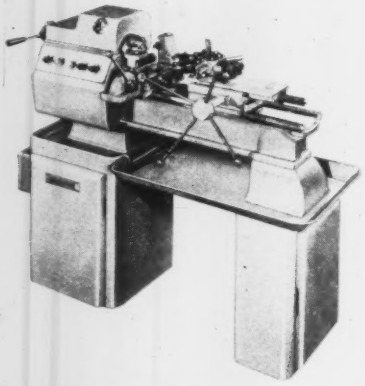
Manufacturers of DIAMONTEX, the Perforated Metal Lay-In panel for better Acoustical Ceilings. New Bulletin No. 47, gives complete information. Write, today, for free copy.

NEW PRODUCTS and equipment

110 volts and 70 psi air pressure. *Write*: Garrison Machine Works Inc., 515-525 Bannock St., Dayton 4, Ohio. *Phone*: Hemlock 6708

Turret Lathe

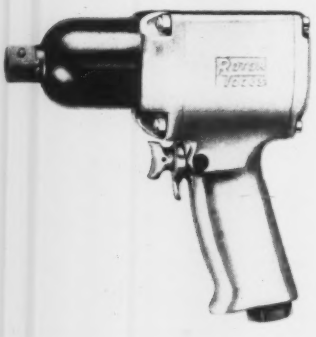
This high speed unit is designed for secondary operations and production jobs. It features modern styling and controls, 13-in. swing over the bed ways, and a 1 1/6-in. collet. The six-station ram turret handles up to 1 in. shank tools.



Spindle speeds (40 to 2000 rpm) are selected by fast-slow pushbutton controls and read on the headstock tachometer. *Write*: Sheldon Machine Co. Inc., 4258 N. Knox Ave., Chicago 41, Ill. *Phone*: Mulberry 5-1970

Air Impact Wrenches

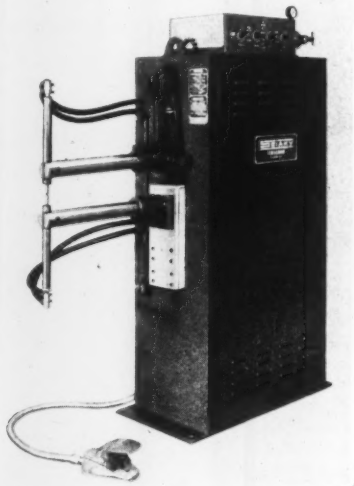
The J-40 series of 3/8-in. units are available in side throttle handle or lever throttle types. Units have direct drive (no gearing). Power is furnished by a high speed, six-bladed, air motor.



The mechanism has only two impacting members, and they can be turned over for longer life. *Write*: Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 32, Ohio. *Phone*: Redwood 1-8888

Rocker Arm Spotwelder

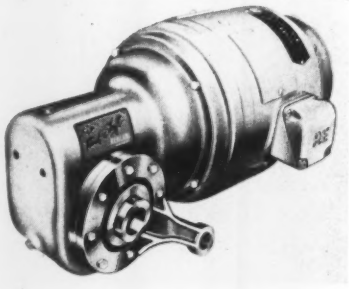
These SR O welders are available in standard O size frames, with a 30 or 50 kva transformer. Throat depth is varied from 12 to 42 in. by choice of arm lengths. The unit



is for general purpose uses where relatively light gage metals are fabricated. *Write*: Dept. SR O, Sciaky Bros. Inc., 4915 W. 67th St., Chicago, Ill. *Phone*: Portsmouth 7-5600

Gear Motor

This right-angle unit features a hollow shaft that permits direct coupling to equipment merely by inserting the driveshaft.



Units available have 1/2 to 2 hp motors and 13 gear reduction ratios from 18 to 250 rpm. *Write*: Reuland Electric Co., Alhambra, Calif. *Phone*: Cumberland 3-4171

NEW literature

Write directly to the company for a copy

Combustible Gas Analyzer

No. 1703-4, an 8-page bulletin, presents three basic instrumentation systems for centralized control, including remote equipment usable at high temperatures. Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.

Double Column Bedmill

Bulletin 2866 describes a unit with hydraulic tracer control which handles production profiling, die and mold making, scanning, and duplicating. George Gorton Machine Co., Racine, Wis.

Platinum Products

This brochure describes company products, special products, and services available. Tables and charts on standard alloys and platinum are included.

In addition, several pages are devoted to general information, useful for reference: Physical properties of the elements, comparative lengths, areas, volumes, and weights. J. Bishop & Co. Platinum Works, Malvern, Pa.

Rare Earths and Metallurgy

This publication contains abstracts of a ten-year survey of world literature on "Metallurgical Applications of the Rare Earths," ferrous and nonferrous. Davison Chemical Co., P. O. Box 488, Pompton Plains, N. J.

Cold Roll Forming

This 88-page reference manual discusses the economics, mechanics, and applications of cold roll forming. Included are descriptions and complete "how to" instructions on special operations. Yoder Co., 5500 Walworth Ave., Cleveland 2, Ohio.

Grinding Wheels

The "Snagging Handbook" is a manual of specifications, handling and maintenance information, and safety precautions. A "How To Establish Grinding Costs" chapter is included. Peninsular Grinding Wheel Sales Corp., 729 Meldrum Ave., Detroit 7, Mich.

Catalogs

No. 1000, 36 pages, covers charts and procedures for Thomas suspension insulators, and clamps and fittings. No. 1050, 8 pages, contains charts and information on the selection of suspension and strain clamps for conductors and construction characteristics of conductors. Delta-Star Electric Div., H. K. Porter Company Inc., Lisbon, Ohio.

Ductile Iron Castings

MPC, a 12-page bulletin, lists applications of ductile iron for machine parts. Included are material specifications and foundry facilities available for production to meet specific requirements. Cooper-Bessemer Corp., Mt. Vernon, Ohio.

Chemical Coatings

Bulletin 1424-A describes protective and prepaint coating chemicals for aluminum. Advantages, methods of application, equipment used, and type products treated are included. American Chemical Paint Co., Ambler 1, Pa.

Marking Machines

This 8-page catalog describes standard marking machines. Included are specifications and service and technical information. Markem Machine Co., Keene 43, N. H.

Stainless Tubing

Technical Data Card 148A summarizes hot working, annealing, welding, and forming data on 24 stainless tubing steels. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

Rubber Parts

This chart lists the standards and characteristics of molded products, cut parts, rubber covered rolls, punched and extruded parts in natural rubber, Neoprene, Buna N, GR-S, Thiokol, and Butyl. Williams-Bowman Rubber Co., 1945 S. 54th Ave., Cicero 50, Ill.

CRANEMASTERS

. . . fill the bill for CONTINENTAL CAN CO.

This 10-ton cab-operated *Cranemaster* is the first of two in service for Continental Can Co. Like so many other manufacturers, Continental Can Co. found Cranemasters *the top initial value* . . . with lasting satisfaction assured by Abell-Howe's years of experience in building overhead handling equipment that better *fills the bill* for industry of all kinds.

CAPACITIES TO 15 TONS —SPANS TO 60 FT.

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FOR BETTER CONTROL OF COSTS!

First, you save on Abell-Howe low engineering and production costs! Then you save on operating costs because of *Cranemaster* speed and dependability... and the precise control you need for the most demanding lifting-loading jobs.

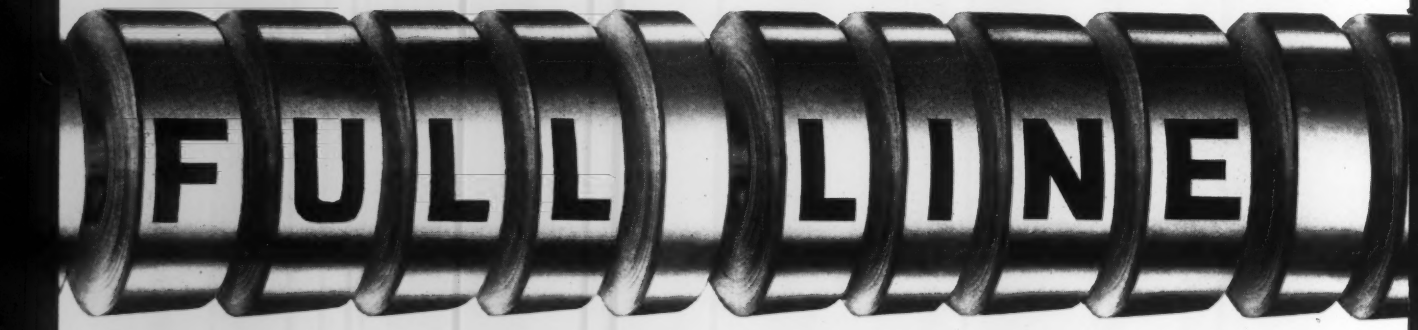
Send For Bulletin C-110

7747 Van Buren Street **ABELL-HOWE COMPANY** Forest Park, Illinois

a wide selection...

from J&L STRIP STEEL DIVISION

restricted and standard specification cold rolled strip steel



Let's examine this "Full Line" product list of cold rolled strip steel. At J&L it includes all carbon grades, coated and uncoated, alloy, stainless and tempered spring steel. It offers all thicknesses from .001" or less to .156" or more, in widths from ¼" to 24"—and tolerances for gauge and width closer than standard when required. There are "Full Line" advantages, too, in a range of controlled tempers and structures possible only with the variety of annealing, heat treating and rolling processes found at J&L.

Your "Full Line" benefits can start by specifying J&L because only J&L makes standard and restricted specification cold rolled strip steel in such a wide range of analyses, grades and sizes to accurately meet the most exacting need.

For Strip Steel, call the Strip Steel Specialist — J&L.

J&L STRIP STEEL DIVISION produces a full line of restricted and standard specification strip steel in these grades and types:

- Low Carbon
- High Carbon
- Tempered Spring Steel
- Molten Zinc Coated (Jalzinc)
- Electrolytic Zinc, Tin, Copper and Brass Coated
- Alloy
- Stainless
- Painted

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Jones & Laughlin

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FORMERLY THE COLD METAL PRODUCTS COMPANY

Market Outlook

ALTHOUGH cutbacks in steel production suggest that we haven't hit bottom yet, there's room for guarded optimism. STEEL's quarterly survey of component inventories (Page 137) shows that buyers have worked their stocks down to the level of current consumption. They aren't likely to build inventories during the second quarter, but at least they'll buy for replacement.

The effect won't be felt immediately, of course, since inventories are backed up all along the line. Manufacturers of parts have big stocks of finished goods, and mills have plenty of semifinished steel.

In a generally sagging market, construction, shipbuilding, and canning are the leaders.

CONSTRUCTION PICKS UP—As work on the St. Lawrence Seaway moves into high gear, New York's power authority is asking for bids on 94,500 tons of reinforcing bars for May delivery. Indiana's highway contracts for April are equivalent to more than half the road building authorized by the state during all of 1957. Illinois also plans to increase its highway program.

TIN PLATE LEADS—With canmakers talking of a record year, tin plate continues to top all other products in demand. Operations are running at 80 per cent of capacity or better. Soft drinks are the special stimulant, but good food packs are expected this summer.

RAILROAD ORDERS—Adding strength to an otherwise depressed market, the Chicago, Milwaukee, St. Paul & Pacific Railroad Co. is taking bids on Apr. 17 for $12 million worth of equipment. Scheduled for fall delivery are 1000 steel boxcars and 150 hoppers. Last year, the company spent $11.8 million for freight cars.

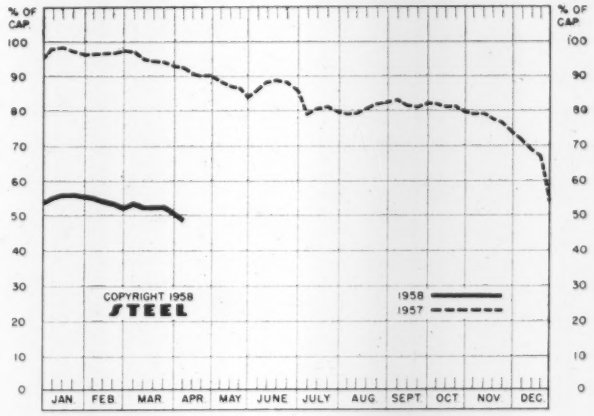
APPLIANCE LAYOFFS—Less encouraging is the news that two large makers of household appliances are planning production cutbacks. Tomorrow, Frigidaire Div. of General Motors Corp. will lay off more than 1100 employees at Dayton, Ohio, "to keep inventories in line with the sales outlook." The Columbus, Ohio, plant of Westinghouse Electric Corp. was also closed this week. Nevertheless, demand for low silicon sheets (which go into fractional horsepower motors) is improving slightly—a sign that motor manufacturers still are confident about one of their major customer groups, appliance makers.

PRODUCTION SKIDS—Because of sharply curtailed automotive buying and less-than-normal upturns for other big consumers, steelmakers are still cutting production. Last week, cutbacks and the observance of Good Friday caused steelmaking operations to drop two points to 48.5 per cent of capacity. Production was 1,298,000 net tons of steel for ingots and castings.

PRICE CUTTING?—As the sales squeeze continues in the automotive industry, there's talk of price cutting at the mill level. For a percentage of commitments, one mill reportedly is invoicing customers at published mill prices, later issuing them credits which serve as discounts on future orders. A tool steel producer reports that customers are suggesting that he trim prices, extend terms, and provide a warehouse service.

SELLS PUBLIC ON STEEL—U. S. Steel Corp. is going straight to the consumer in an effort to lift sales out of the doldrums. Its "new look" merchandising program (new theme, trademark, and labels) is designed to "hold and extend the preference of the general public for products of steel" over competitive materials.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Apr. 6	Change	Same Week 1957	Same Week 1956
Pittsburgh	53.5	— 2.0*	95	100
Chicago	53.0	— 0.5	87	100.5
Mid-Atlantic	49.0	— 2.0	95	98
Youngstown	45.0	— 2.0	89	103
Wheeling	67.5	— 5.0	90	96.5
Cleveland	32.0	0*	93.5	93.5
Buffalo	37.0	0	98	105
Birmingham	47.5	0	97	93
New England	48.0	— 4.0	65	85
Cincinnati	44.0	—11.0*	69.5	89
St. Louis	70.0	0	101	95
Detroit	22.0	— 6.0	95.5	95.5
Western	63.0	— 4.0	104	104
National Rate	48.5	— 2.0	92.5	99.5

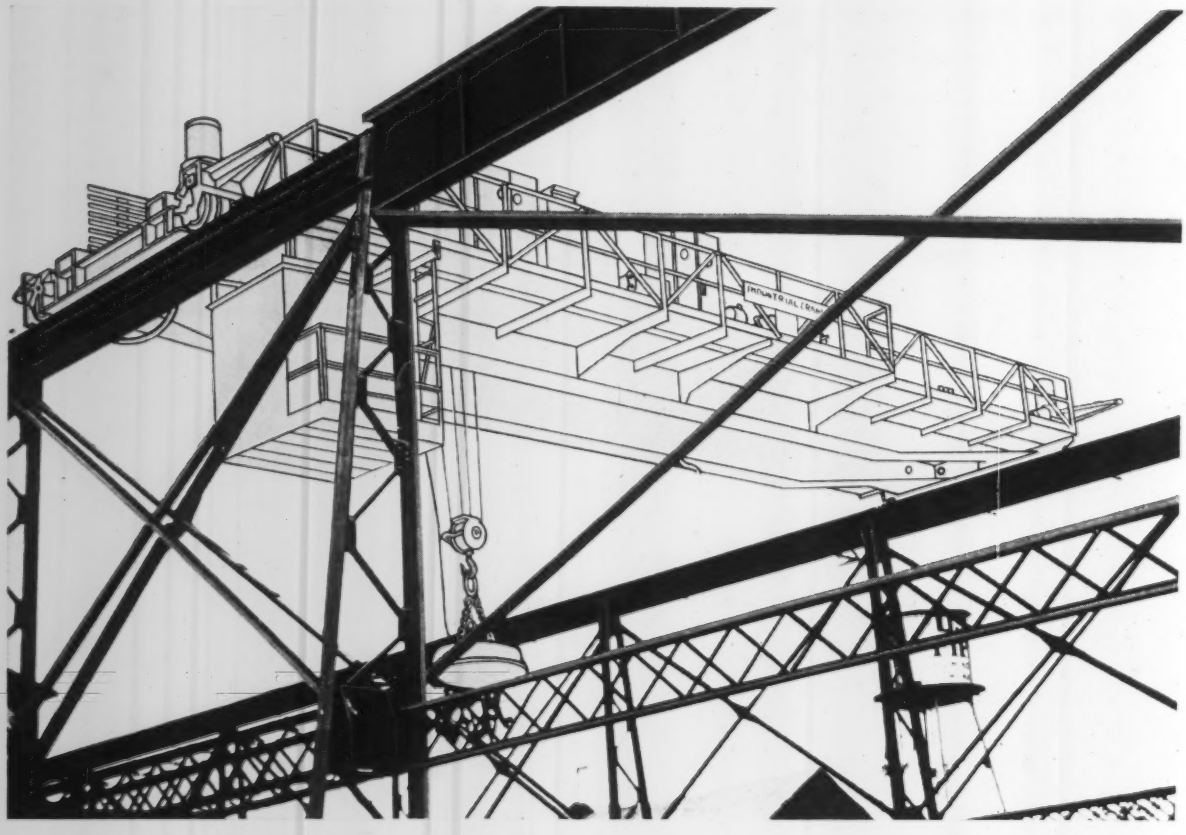
INGOT PRODUCTION‡

	Week Ended Apr. 6	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	80.8†	85.0	88.7	144.4
NET TONS (In thousands)	1,298†	1,366	1,425	2,319

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,699,173 in 1958; 2,559,490 in 1957; 2,461,893 in 1956.

Metalworking Outlook—Page 55 Technical Outlook—Page 101

VERSATILE PERFORMER . . .



Industrial HEAVY DUTY CRANE

Operates in and out of doors, even in snow and icy weather!

This **Industrial** 10 ton magnet crane, another in the versatile **Industrial** line, operates both inside and outside the plant, even under severe operating conditions. Special sanders on the wheels give positive traction for smooth operation when runway is wet or icy. Full length truss type platform has decked walkways for convenient maintenance. Enclosed cab has full magnetic controls.

These Industrial features give you rugged dependability and low cost maintenance:

- Heavy duty MCB roller bearing bridge and trolley trucks.
- Precision machined components throughout.
- All welded box girder with built-in camber.
- Wide choice of electrical controls.
- Rolled forged steel bridge and trolley wheels.
- Full length walkways and completely decked trolleys.

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Consult with Industrial Crane and Hoist for practical answers to your materials handling problems.

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INDUSTRIAL CRANE & HOIST

INGERSOLL PRODUCTS DIV. BORG-WARNER CORP.

1550 S. PAULINA STREET, CHICAGO 8, ILLINOIS

Export Sales: Borg-Warner International, 36 South Wabash Ave., Chicago 3, Illinois

STEEL
QUARTERLY SURVEY

COMPONENTS	CURRENT INVENTORIES					2nd Quarter FORECAST		
	UNDER 10 DAYS	10-30 DAYS	30-60 DAYS	60-90 DAYS	3-6 MONTHS	LOWER	SAME	HIGHER
CASTINGS . . . . . Die, gray iron, malleable, nonferrous, steel.	4%	27%	45%	21%	3%	22%	64%	14%
OTHER FORMED COMPONENTS . . . . Forgings, stampings, springs, wire shapes.	3%	24%	39%	23%	11%	22%	61%	17%
MACHINED COMPONENTS . . . . . Bearings, couplings, cylinders, gears, screw machine products.	6%	28%	36%	22%	8%	22%	60%	18%
ELECTRICAL EQUIPMENT, MOTORS . .	17%	25%	36%	18%	4%	25%	65%	10%
FASTENERS	1%	24%	54%	14%	7%	24%	61%	15%
MECHANICAL RUBBER GOODS, BELTING	12%	20%	44%	22%	2%	17%	71%	12%

FIGURES are percentages of respondents to STEEL's quarterly survey.
COLOR UNDERSCORED figures show how most respondents reported.

Inventory Reduction Grinds to Halt

With stocks adjusted to current needs, component buyers will be back in the market this quarter. But they'll order only for replacement, barring an upturn

STEEL's quarterly survey shows that buyers of industrial components have worked their stocks down to the level of current consumption.

As a Brooklyn steel products manufacturer puts it: "Our inventory is in just the position we would like to maintain. We have enough supplies on hand to keep up normal production."

No Buildup Ahead—Few component buyers are going to start building inventories during the second quarter. Caught with topheavy stocks when business dried up last year, they're in no mood to burden themselves unnecessarily. If they start building, it will be because the signs of a business upturn are unmistakable.

Even if they don't increase their inventories, buyers will be in the market for limited quantities of parts. They'll order enough castings, forgings, stampings, bearings, gears, and other components to replace those that are being taken out of stock. Result: Partmakers can expect small orders for quick delivery during the second quarter.

Uncle Sam Steps In—In the few cases where survey respondents expect larger inventories, defense spending is a big factor. Says a midwestern manufacturer of electrical products: "We expect our inventories to be higher three months from now because of a large government contract and not because of a change in policy or an anticipated increase in normal production." A buyer for the ordnance division of a food machinery company adds: "An increase in our operating level makes for an increasing inventory."

In the last three surveys, the percentage of respondents predicting lower inventories has fallen while the percentage of those forecasting the same or higher stocks has gone up. In the previous survey (STEEL, Jan. 6, p. 485), the buyers voted 2 to 1 (26 per cent to 13 per cent) for lower inventories. Now the margin is only 3 to 2 (22 per cent to 15 per cent). A decided majority (63 per cent) expects no change in inventory level during the second quarter.

Last October, 69 per cent of the survey participants said their inventories were lower than they had been three months earlier. In January, 46 per cent reported that their stocks were below the October level. Today, 36 per cent have smaller inventories than they had in January. The figures add weight to the opinion that inventories are being stabilized.

Deliveries Good—The buyers are unanimous in reporting that deliveries are generally satisfactory. One purchasing agent calls them "too good." A few (7 per cent) say they

ARONSON
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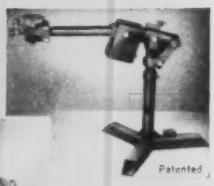
Aronson TracTred (T. M. Reg.) Turning Rolls for thin-walled heavy cylindrical work to 27 tons capacity. Zero to 100 IPM turning speed and Built-In Grounding.

Aronson Universal Balance Positioners (T. M. Reg.) position your weldments effectively, instantly for downhand welding. Capacities to 2000 lbs.



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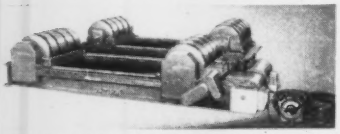
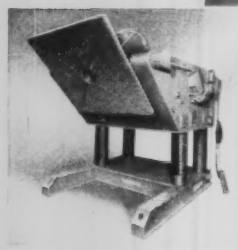
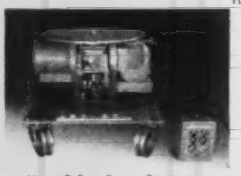


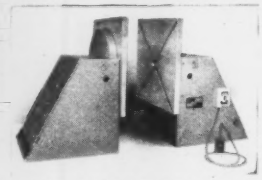
Heavy Duty Precision Built Rubber and Steel Tired Turning and Pipe Rolls, 100% overload protected. Capacities to 600 Tons.



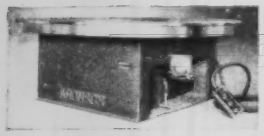
Fully Automatic Gear Driven Positioners, featuring Geared Elevation, 135° Tilting and Variable or Constant Speed Rotation. Capacities to 350,000 lbs.



Model D Gear Driven Positioners. Compact, Precise, Rugged. Capacities to 1000 lbs.

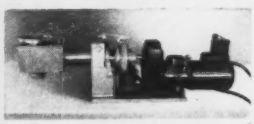


Rugged Head and Tail Stock for positioning bulky weldments between centers. Table Backup for Zero Deflection. Magnetic Braking. Capacities to 160,000 lbs. Geared Elevation Optional.



Heavy Duty Floor Turntables with precision speed control and Magnetic Braking, used for welding, burning, X-raying, etc. Capacities to 120,000 lbs., various heights and speeds.

Bench Turntable Automatic Positioners with Mercury Grounding. Capacities to 500 lbs.



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have trouble obtaining castings; 5 per cent have difficulty with forgings; 5 per cent with bearings. "Unground ball bearings require eight to ten weeks' leadtime," one man complains.

Most of the buyers favor 30 to 60 day inventories of the major components. Ten per cent say their stocks of castings are too heavy; 6 per cent have too many forgings; 6 per cent have too many bearings.

Stainless Steel . . .

Stainless Steel Prices, Page 150

Market observers are watching closely for price developments in the stainless market now that prices on aluminum are lower. It is competitive with stainless in many applications.

McLouth Steel Corp., Detroit, a large supplier to the automotive industry, is reported to have closed down its six electric furnaces to facilitate a construction program while demand is slow.

The Stainless Steel Div., Jones & Laughlin Steel Corp., Detroit, begins the manufacture of stainless steel wire next month. It will produce $\frac{1}{8}$ to $\frac{1}{2}$-in. wire.

Wallingford Steel Co., Wallingford, Conn., last week announced it is now quoting 55.25 cents per pound on type 305, cold-rolled stainless strip and 81 cents per pound on type 316. The market on these grades has been 55 cents and 80.75 cents.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 147 & 148

More fabricators who use sheets and strip are being caught in a cost-price squeeze. Competition for the declining volume of business is getting sharper. Some component prices which were marked up to cover the last increase in steel have given way.

Expectations are the steelmakers will be under increasing pressure for price concessions. Last week, a Detroit seller was offering to invoice customers at published mill prices, issuing credits which can be used as discounts when placing future orders. This is the first report of price cutting at the mill level, except for the recent lowering of extras on hot strip. If there is any hedge buying in anticipation of a midyear advance, it prob-

ably won't start until well along in this quarter.

Buyers are following a conservative policy in placing orders. There doesn't seem to be any fixed buying pattern, though. While little improvement is noted in April bookings, some business is reported coming through for May shipment, notably in New England. Demand from appliance makers is spotty, but one sheetmaker says its appliance sheet volume in the first quarter bettered that of a year ago. Growing interest in silicon sheets indicates a possible stirring in appliance needs.

Although many consumers have cut their inventories to the point they are dependent upon prompt shipment tonnage, inventories of some manufacturers continue high. Cutbacks in auto production have boosted automotive stocks into the 30 to 40 day level at many plants.

Steel Bars . . .

Bar Prices, Page 146

"We've noticed a little pickup in the last week, but March won't be any better than February. We see no improvement for the second quarter."

That comment of a Pittsburgh area producer of cold-drawn bars sums up the situation in the commercial steel bar market.

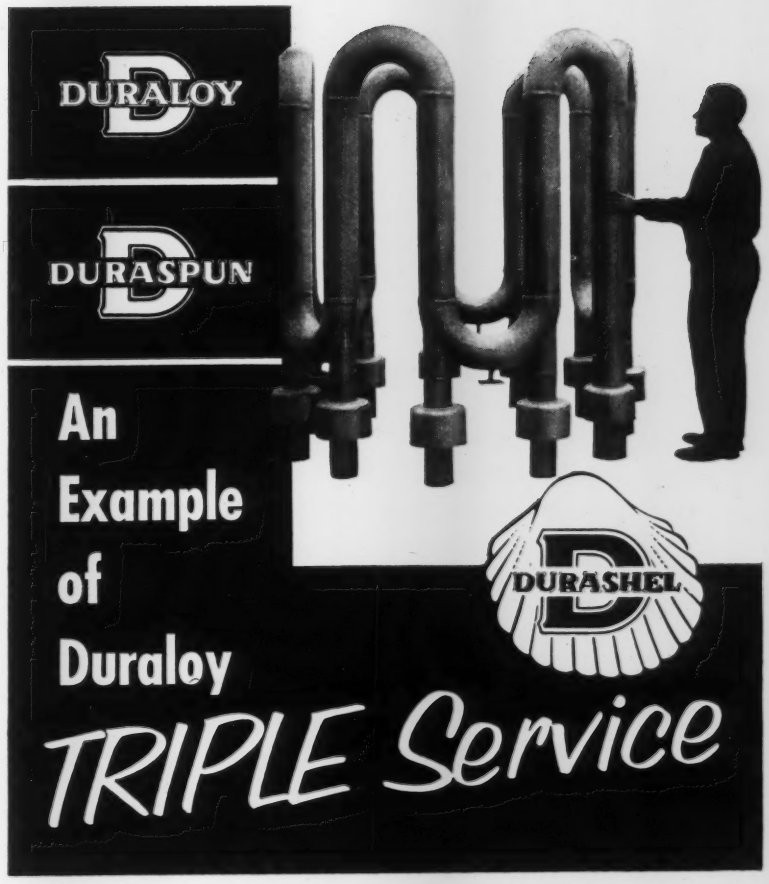
Demand is scarcely holding its own at most points of consumption. Pittsburgh producers say auto builders aren't buying more than 30 days ahead. They often schedule orders for one month and later ask that deliveries be held for the following month. Some orders are canceled.

Detroit area producers report continued lagging demand. They are hopeful of a pickup in April orders, but so far there are no favorable signs. Alloy bars appear to be particularly sluggish. One district seller says: "We're stocking so damn many sizes of bars we're nothing more than a king-sized warehouse right now!"

Tool Steel . . .

Tool Steel Prices, Page 150

A Pittsburgh producer of tool steels reports its March orders were 40 to 50 per cent above its February bookings. Buyers started coming back into the market in January, replacing stocks depleted in



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November and December.

Tooling for the 1959 cars is underway, and some interests are concerned about foreign competition, particularly on the straight carbon material used in massive forming operations.

Wire . . .

Wire Prices, Pages 148 & 149

The slight stepup in requirements of welded highway and building mesh is not being matched by demand for manufacturers' wire, spring, heading, and other industrial grades. Merchant products are moving better as spring opens up, but the seasonal gains are still disappointing.

For months, buying of high carbon specialties has been slack in New England. Day-to-day bookings show only slight change. Producers anticipate improvement in the second half. Automotive support is not likely to be strong this quarter, and no substantial upturn is anticipated before late third quarter.

Rod inventories are reported to be generally heavier than stocks of finished wire products.

Pig Iron . . .

Pig Iron Prices, Page 151

With prompt shipment tonnage readily available, pig iron buyers are not ordering far ahead. Cleveland merchant iron sellers say March orders were fairly numerous, but total tonnage was small. They think April volume will about equal that of March, but they believe the buying pattern indicates that consumers' inventories have been pretty well liquidated.

First quarter iron shipments in New England were 20 to 25 per cent behind those in the like period last year. The decline was sharpest in the movement of tonnage to the gray iron shops; malleable foundry operations were a little better, but several companies are reducing their melts this month.

Foundry operators in upper New York are not optimistic about prospects for this quarter. One large district shop was closed by a strike. Reduced workweeks continue to be the rule, and many shops have laid off workers.

April demand for foundry iron in the Chicago district is expected

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to equal March shipments, which were more than 10 per cent below expectations. Farm equipment foundries are busier than the general run of shops. Caterpillar Tractor Co., Peoria, Ill., resumed a five-day week last Monday. The return to a normal work schedule ended ten weeks of curtailed output.

Operations of 24 to 32 hours are common for many jobbing shops in the Midwest.

In New England, second quarter prices on pig are unchanged for contract customers of the Mystic Iron Works.

Tubular Goods . . .

Tubular Goods Prices, Page 150

There are few signs of improved sales in tubular goods. Oil country tubing demand continues dull, but producers are hopeful of better volume this quarter as the weather improves.

The outlook for pressure tubing should brighten with expansion of the highway program and accompanying increased requirements for construction machinery. Tubing sales are at month-ago levels, Detroit sellers report. One area producer reportedly holds 1200 tons of steel in stock, but is scheduling only enough output to use up 300 tons.

Despite slackening orders from utilities and slowness in demand on chemical industry account, pressure tubing is moving better than mechanical tubing. April bookings for mechanical tubing are down. Warehouses are cutting orders.

Plates . . .

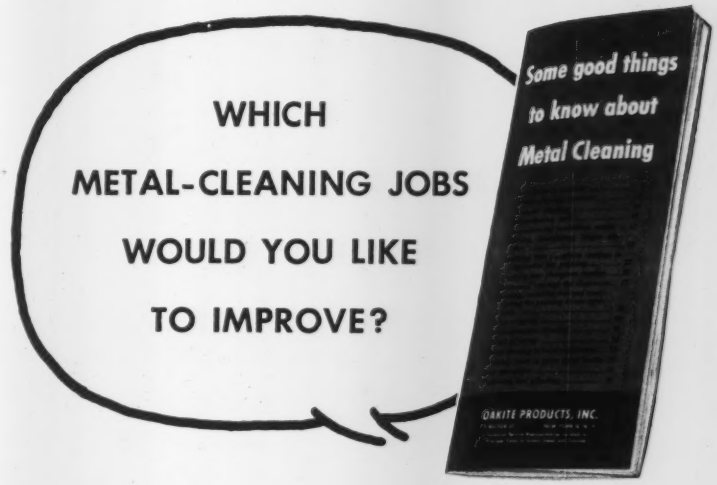
Plate Prices, Page 146

Major consumers of heavy plates, such as builders of electrical equipment and mill machinery, are expected to be out of the market another month or two. Their inventories are still too large "for comfort," and they are feeling the effect of lagging demand for their products.

Reflecting the weakness in the plate market, a New York broker has been offering tonnage below the standard price in the Pittsburgh area. But local interests question the quality of the bargain plates.

A Pittsburgh producer says orders from the Caterpillar Tractor Co.

(*Please turn to Page* 143)



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¶ Do you need room-temperature cleaning combined in one operation with temporary rustproofing? *See pages 12 and 14.*

¶ Do you know the advantages of alkaline pickling? *See page 21.*

¶ Have you compared the values of iron phosphate coating and zinc phosphate coating in preparation for painting? *See pages 22 and 25.*

¶ Can you use a cleaner that removes rust and oil at the same time; often eliminating all need for pickling? *See page 30.*

¶ Do you have trouble stripping epoxy resins, pigment residues, phosphate coatings and under-paint rust? *See page 31.*

¶ How do you clean parts that are too large to be soaked in tanks or sprayed in machines? *See page 31.*

¶ Are you getting full profit out of your finishing barrels? *See page 32.*

¶ What do you do when oversprayed paint neither floats nor sinks in your paint spray booth wash water? *See page 35.*

¶ Do you need better protection against rusting in process or in storage? *See page 37.*

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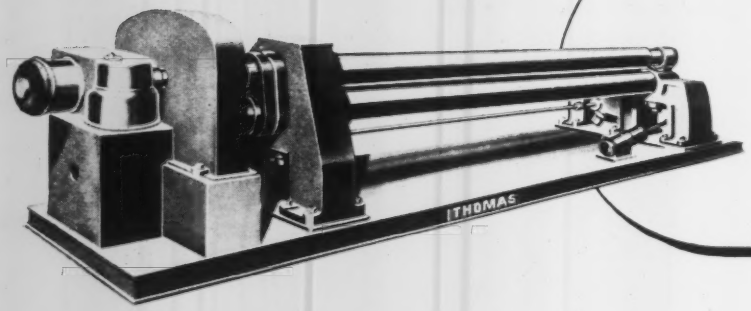
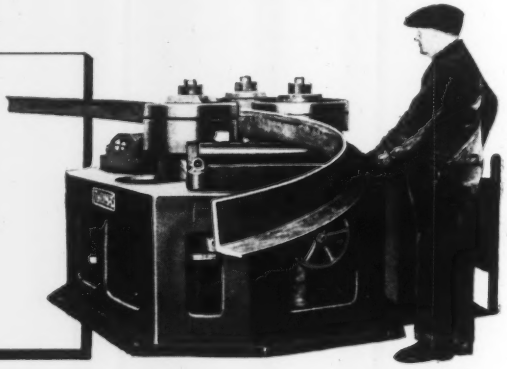


Plate Bending

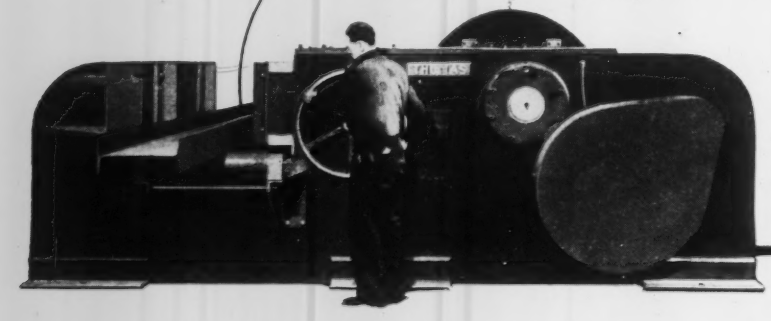
The Thomas line of Initial or Pinch Type Plate Rolls is comprised of twelve sizes of all steel machines completely modern in design. Features include enclosed drive running in oil; power adjustment and power drop-end.

Angle Bending

Thomas All Steel Angle Rolls are built in both vertical and horizontal styles, and capacity range is from 2 x 2 x ¼" to 6 x 6 x ⅞" angles. Shapes other than angles may also be bent by using special rolls.



Bending and Straightening



Thomas All Steel Bending and Straightening Machines, for cold working of structurals; Bars; Billets; Rails and other shapes, — built in six sizes — from 50 to 400 tons.

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(*Concluded from Page* 141)

are improving slightly now that that company has returned to a five-day week.

Demand is barely holding in New England. Fabricating shop operations are slower. The small tank business is showing something of a seasonal lift in activity, but needs are being met largely from inventory. Plate specialty volume is off.

U. S. Steel Corp. is planning major improvements for its wide plate manufacturing facilities in the Chicago district. Engineering work is underway. Progress report: Plate mill facility improvements in the Chicago district which were announced in 1956 are nearing completion.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 146

Thousands of tons of steel required for St. Lawrence Seaway construction are scheduled to be placed over the next couple months. Some 94,500 tons of reinforcing steel are involved in pending work. The New York State Power Authority closes on three contracts May 1, 6, and 20.

Reinforcing bars share with structural shapes and plates the increase in demand arising from expanding construction programs. Close to 5000 tons of bars are pending for substructure work on the new House building in Washington.

Wire fabric and reinforcing bar sales are moving along reasonably well as spring construction programs get going in the Detroit area. Orders that had originally been expected in March are appearing now. A sizable increase in volume is expected to show up next month.

Welded mesh for highways is more active than it was, but demand has not built up sufficiently to take up the increase in capacity completed in 1956-57. Rhode Island has a section calling for 645 tons.

At Cleveland, an office building will take 2000 tons of bars.

Warehouse . . .

Warehouse Prices, Page 151

While distributors are disappointed by March volume, business was slightly better than it was in February. Expectations are April will see a continuance of the uptrend, with spring building requirements exerting a favorable influence.

Warehouse prices, in the main, are firm at most points. Philadelphia area sellers now quote hot-rolled strip at $8.67, carbon plates at $8.75, and floor plates at $9.75. They have also put new quantity extras into effect on all hot-rolled items.

Ferroalloys . . .

Ferroalloy Prices, Page 154

Electro Metallurgical Co., a division of Union Carbide Corp., New York, has increased the purity of its columbium metal to 99.6 per cent through reductions in oxygen and nitrogen content.

The new specifications are: Columbium, 99.6 per cent min; oxygen, 0.10 per cent max; nitrogen, 0.04 per cent max; carbon, 0.05 per cent max; tantalum, 0.15 per cent max; titanium, 0.01 per cent max; iron, 0.01 per cent max; silicon, 0.01 per cent max; boron, 0.0001 per cent max.

Iron Ore . . .

Iron Ore Prices, Page 152

Iron ore stocks on hand Mar. 1 totaled 57,795,051 gross tons, vs. 41,632,273 tons a year ago, reports the American Iron Ore Association.

The breakdown: U. S. Lake Superior ore, 39,152,167 tons, vs. 28,698,106 a year ago; other U. S. ores, 3,355,048, vs. 3,299,193 tons; Canadian Lake Superior ore, 1,377,650, vs. 1,411,823; other Canadian ores, 5,708,929, vs. 3,910,313 tons; foreign ores (other than Canada), 8,201,257 tons, vs. 4,312,938 tons.

Consumption in February was 6,861,624 tons, vs. 10,939,448 tons in the like month of 1957. The total for the first two months this year was 14,891,499 tons, vs. 22,984,396 tons a year ago.

There were only 175 blast furnaces active on the last day of February out of a total 275 in the U. S. and Canada. Last year 259 were operating on the like date.

Steel Imports by Country of Origin—1957

(Net tons)

Products	Total	Canada	Sweden	United Kingdom	Netherlands	Belgium Luxembourg	France	West Germany	All Other
Ingots, etc.	7,785	7,043	98	9	.....	388	132	113	2
Wire rods	54,369	151	10,958	10,105	.....	17,799	2,307	10,562	2,487
Reinforcing bars	160,371	60	33	.....	.....	86,288	55,762	1,261	16,967
Carbon bars	26,108	279	1,148	130	.....	14,196	8,205	320	1,830
Alloy bars	1,658	169	1,056	245	.....	.....	.....	59	129
Drill steel	1,468	.....	144	60	.....	.....	.....	13	1,251
Skelp	275	.....	.....	.....	.....	.....	.....	.....	275
Plates	22,166	255	.....	179	.....	3,940	1,272	9,133	7,387
Sheets & strip	25,782	14,298	350	153	.....	4,073	212	5,505	1,191
Tin & terne plate	123	112	.....	11	.....	.....	.....	.....	.....
Shapes, 3 in. over	236,663	4,275	4,002	823	226	139,509	53,219	13,205	21,404
Shapes, under 3 in.	74,854	739	379	261	890	54,587	11,485	3,636	2,877
Sheet piling	31,808	157	.....	.....	.....	16,754	5,465	9,432	.....
Rails, accessories	5,045	2,049	.....	.....	.....	1,672	43	1,280	1
Wheels, axles	372	370	.....	2	.....	.....	.....	.....	.....
Pipe & tubing	190,727	21,414	2,307	19,769	288	4,052	25,099	71,349	46,449
Barbed wire	63,775	56	.....	685	3,511	35,293	2,532	21,169	529
Round wire	70,764	114	584	6,834	9,806	39,148	7,228	6,160	890
Flat wire	14,616	132	4,297	2,450	.....	2,712	2,464	2,532	26
Wire rope	10,814	109	97	2,826	1,038	2,873	.....	3,384	487
Gal. fencing, etc.	30,135	11	.....	974	822	22,475	812	5,028	13
Wire nails	134,838	164	107	14,930	11,426	36,462	2,147	28,647	40,955
Bar iron, etc.	112	1	40	71	.....	.....	.....	.....	.....
Cast pipe	5,519	30	.....	1,792	.....	.....	462	42	3,193
Malleable pipe	3,246	5	.....	64	.....	.....	.....	71	3,106
Castings, forgings	9,395	2,783	195	1,237	27	602	45	1,030	3,476
Die blocks, etc.	242	87	.....	66	.....	21	27	19	22
Saw plates	50	4	25	15	.....	.....	.....	.....	6
Fabricated shapes	91,359	248	.....	6,695	.....	2,375	6,227	26,159	49,655
Sashes, frames	2,709	.....	.....	2,546	.....	25	.....	.....	138
Nails & staples	2,733	233	13	170	243	499	55	766	754
Bolts, nuts, etc.	26,774	685	2,944	1,245	4,091	4,037	3,466	3,097	7,209
Bale ties	483	.....	.....	.....	10	358	33	82	.....
Cotton ties	13,865	.....	.....	7,260	.....	6,237	.....	239	129
Pig iron	225,386	221,165	3,135	.....	.....	.....	.....	34	1,052
Sponge iron	9,676	984	8,692	.....	.....	.....	.....	.....	.....
Ferromanganese	281,058	102,047	.....	.....	.....	3,152	101,256	16,289	58,314
Spiegeleisen	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ferrosilicon	3,832	3,795	.....	.....	.....	.....	.....	37	.....
Ferrochrome	30,795	4,178	619	.....	80	.....	2,920	7,312	15,686
Other ferroalloys	3,506	3,082	56	206	10	9	2	40	101
Grand Total	1,875,256	391,284	41,279	81,813	32,468	499,536	292,880	248,005	287,991
Scrap	204,800	195,688	111	143	132	.....	30	909	7,787

Data from American Iron & Steel Institute based on Commerce Department figures.

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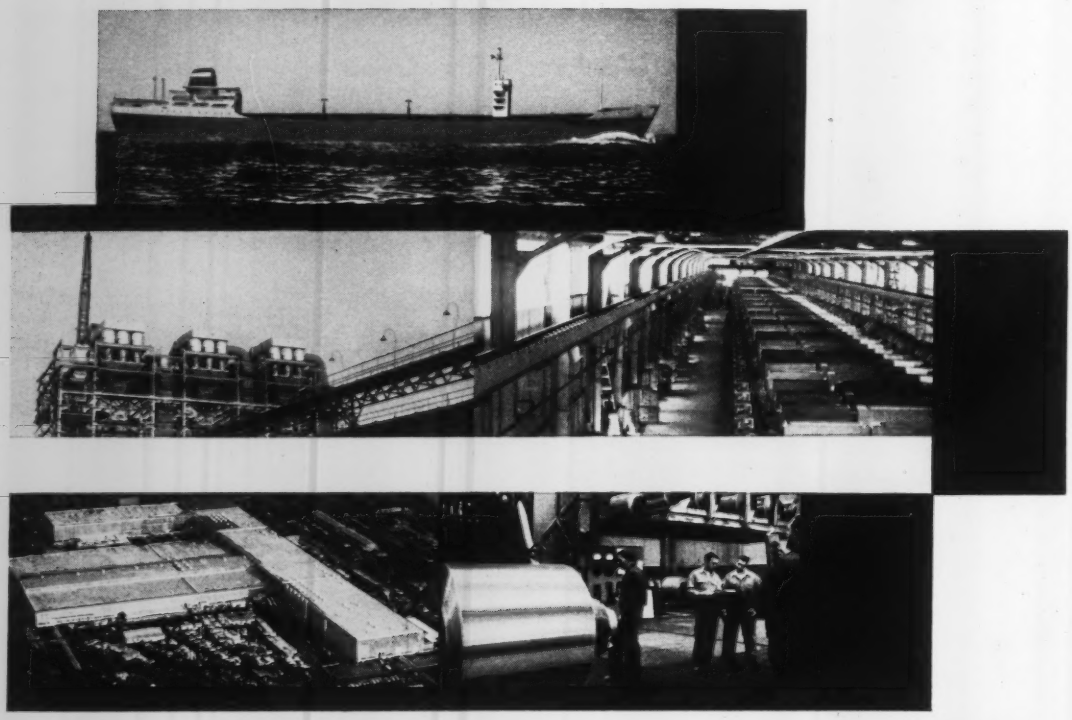

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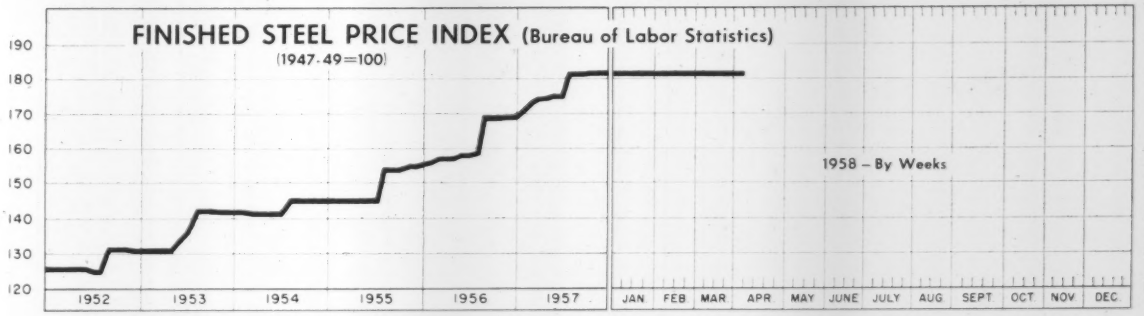
Price Indexes and Composites



Apr. 1, 1958	Week Ago	Month Ago	Mar. Avg	Year Ago
181.6	181.6	181.6	181.6	174.0

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Apr. 1

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.600	Bars, Reinforcing	6.135
Rails, Light, 40 lb	7.067	Bars, C.F., Carbon	10.360
Tie Plates	6.600	Bars, C.F., Alloy	13.875
Axles, Railway	9.825	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	60.000	Sheets, H.R., Carbon	6.192
Plates, Carbon	6.150	Sheets, C.R., Carbon	7.089
Structural Shapes	5.942	Sheets, Galvanized	8.270
Bars, Tool Steel, Carbon (lb)	0.535	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.650	Sheets, Electrical	12.025
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.355	Strip, C.R., Carbon	9.243
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.850	Strip, C.R., Stainless, 430 (lb)	0.492
Bars, H.R., Alloy	10.525	Strip, H.R., Carbon	6.095
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	19.814
Bars, H.R., Carbon	6.425	Pipe, Galv., Buttweld (100 ft)	23.264
		Pipe, Line (100 ft)	199.023
		Casing, Oil Well, Carbon (100 ft)	194.499
		Casing, Oil Well, Alloy (100 ft)	304.610
		Tubes, Boiler (100 ft)	49.130
		Tubing, Mechanical, Carbon (100 ft)	24.953
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
		Black Plate, Canmaking Quality (95 lb base box)	7.583
		Wire, Drawn, Carbon	10.225
		Wire, Drawn, Stainless, 430 (lb)	0.653
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Apr. 2 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	239.15	227.41	181.31
Index in cents per lb	6.479	6.479	6.479	6.161	4.912

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$145.42	$145.42	$145.42	$139.71	$110.98
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	64.70	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	64.23	54.66
Malleable Pig Iron, GT	67.27	67.27	67.27	65.77	55.77
Steelmaking Scrap, GT	34.33	34.50	37.17	45.00	43.75

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Apr. 2 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld., Philadelphia	5.725	5.725	5.725	5.365	4.502
Bars, C. F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia	5.545	5.545	5.545	5.31	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.10	5.10	5.10	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.10	5.10	5.10	5.70	4.35
Sheets, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.975-4.225
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-6.05
Wire, Basic, Pittsburgh	7.65	7.65	7.65	7.20	5.225-5.475
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.49	6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.95	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, 7/32-9/16" Pitts.	6.15	6.15	6.15	5.80	4.425

PIG IRON, Gross Ton

	Apr. 2 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$65.50	$55.50
Basic, Valley	66.00	66.00	66.00	64.50	54.50
Basic, deld., Phila.	70.41	70.41	70.41	68.38	59.25
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	65.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	65.00	55.00
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	68.88	59.75
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	65.00	55.00
Malleable, Chicago	66.50	66.50	66.50	65.00	55.00
Ferromanganese, Duquesne	245.00†	245.00†	245.00†	255.00†	228.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$33.50	$34.50	$36.50	$43.50	$44.00
No. 1 Heavy Melt, E. P.	38.50	38.50	38.50	50.00	44.50
No. 1 Heavy Melt, Chicago	31.00	30.50	36.50	41.50	42.75
No. 1 Heavy Melt, Valley	34.50	34.50	37.50	39.50	44.25
No. 1 Heavy Melt, Cleve.	31.50	31.50	33.50	37.00	44.25
No. 1 Heavy Melt, Buffalo	28.50	28.50	28.50	43.50	47.00
Rails, Rerolling, Chicago	54.50	54.50	54.50	55.50	56.00
No. 1 Cast, Chicago	41.50	41.50	41.50	39.50	44.00

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.00	17.00

Steel Prices

Mill prices as reported to STEEL, Apr. 2, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 147; to footnotes, page 149.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$73.50

INGOTS, Alloy (NT)
Detroit S41 ....$77.00
Farrell,Pa. S3 ....77.00
Lowellville,O. S3 ....77.00
Midland,Pa. C18 ....77.00
Munhall,Pa. U5 ....77.00
Sharon,Pa. S3 ....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$77.50
Buffalo R2 ....77.50
Clairton,Pa. U5 ....77.50
Ensley,Ala. T2 ....77.50
Fairfield,Ala. T2 ....77.50
Fontana,Calif. K1 ....88.00
Gary,Ind. U5 ....77.50
Johnstown,Pa. B3 ....77.50
Lackawanna,N.Y. B2 ..77.50
Munhall,Pa. U5 ....77.50
Owensboro,Ky. G8 ....77.50
S.Chicago,Ill. R2, U5 ..77.50
S.Duquesne,Pa. U5 ....77.50
Sterling,Ill. N15 ....77.50
Youngstown R2 ....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Buffalo R2 ....96.00
Canton,O. R2 ....98.50
Clairton,Pa. U5 ....96.00
Conshohocken,Pa. A3 ..101.00
Ensley,Ala. T2 ....96.00
Fairfield,Ala. T2 ....96.00
Fontana,Calif. K1 ....105.50
Gary,Ind. U5 ....96.00
Geneva,Utah C11 ....96.00
Houston S5 ....101.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 ....105.50
Midland,Pa. C18 ....96.00
Munhall,Pa. U5 ....96.00
Owensboro,Ky. G8 ....96.00
Seattle B3 ....109.50
Sharon,Pa. S3 ....96.00
S.Chicago R2, U5, W14 ..96.00
S.Duquesne,Pa. U5 ....96.00
S.SanFrancisco B3 ....105.50
Warren,O. C17 ....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$114.00
Bridgeport,Conn. C32 ..114.00
Buffalo R2 ....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3 ..121.00
Detroit S41 ....114.00
Economy,Pa. B14 ....114.00
Farrell,Pa. S3 ....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 ....114.00
Houston S5 ....119.00
Ind.Harbor,Ind. Y1 ....114.00
Johnstown,Pa. B2 ....114.00
Lackawanna,N.Y. B2 ..114.00
LosAngeles B3 ....134.00
Lowellville,O. S3 ....114.00
Massillon,O. R2 ....114.00
Midland,Pa. C18 ....114.00
Munhall,Pa. U5 ....114.00
Owensboro,Ky. G8 ....114.00
Sharon,Pa. S3 ....114.00
S.Chicago R2,U5,W14 ..114.00
S.Duquesne,Pa. U5 ..114.00
Struthers,O. Y1 ....114.00
Warren,O. C17 ....114.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$117.50
Canton,O. R2 ....120.00
Cleveland R2 ....117.50
Gary,Ind. U5 ....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ..117.50
Warren,O. C17 ....117.50

SKELP
Aliquippa,Pa. J5 ....5.075
Munhall,Pa. U5 ....4.875
Pittsburgh J5 ....5.075
Warren,O. R2 ....4.875
Youngstown R2, U5 ..4.875

WIRE RODS
AlabamaCity,Ala. R2 ..6.15
Aliquippa,Pa. J5 ....6.15
Alton,Ill. L1 ....6.35
Buffalo W12 ....6.15
Cleveland A7 ....6.15
Donora,Pa. A7 ....6.15
Fairfield,Ala. T2 ....6.15
Houston S5 ....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 ....6.15
Joliet,Ill. A7 ....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 ....6.25
LosAngeles B3 ....6.95
Minnequa,Colo. C10 ....6.40
Monessen,Pa. P7 ....6.15
N.Tonawanda,N.Y. B11 6.15
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 ....6.15
Roebling,N.J. R5 ....6.25
S.Chicago,Ill. R2 ....6.15
SparrowsPoint,Md. B2..6.25
Sterling,Ill.(1) N15 ....6.15
Sterling,Ill. N15 ....6.25
Struthers,O. Y1 ....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2..5.275
Atlanta A11 ....5.475
Aliquippa,Pa. J5 ....5.275
Bessemer,Ala. T2 ....5.275
Bethlehem,Pa. B2 ....5.325
Birmingham C15 ....5.275
Clairton,Pa. U5 ....5.275
Fairfield,Ala. T2 ....5.275
Fontana,Calif. K1 ....6.075
Gary,Ind. U5 ....5.275
Geneva,Utah C11 ....5.275
Houston S5 ....5.375
Ind Harbor,Ind. I-2 ....5.275
Johnstown,Pa. B2 ....5.325
Joliet,Ill. P22 ....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2..5.325
LosAngeles B3 ....5.975
Minnequa,Colo. C10 ..5.575
Munhall,Pa. U5 ....5.275
Niles,Calif. P1 ....5.925
Phoenixville,Pa. P4 ....5.325
Portland,Oreg. O4 ....6.025
Seattle B3 ....6.025
S.Chicago,Ill. U5, W14 5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 ....5.275
Torrance,Calif. C11 ....5.975
Weirton,W.Va. W6 ....5.275

Wide Flange
Bethlehem,Pa. B2 ....5.325
Clairton,Pa. U5 ....5.275
Fontana,Calif. K1 ....6.225
IndianaHarbor,Ind. I-2 5.275
Lackawanna,N.Y. B2..5.325
Munhall,Pa. U5 ....5.275
Phoenixville,Pa. P4 ..5.325
S.Chicago,Ill. U5 ....5.275
Weirton,W.Va. W6 ....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.55
Clairton,Pa. U5 ....6.55
Gary,Ind. U5 ....6.55
Houston S5 ....6.65
KansasCity,Mo. S5 ....6.65
Munhall,Pa. U5 ....6.55
S.Chicago,Ill. U5 ....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 ....7.75
Bessemer,Ala. T2 ....7.75
Bethlehem,Pa. B2 ....7.80
Clairton,Pa. U5 ....7.75
Fairfield,Ala. T2 ....7.75
Fontana,Calif. K1 ....8.55
Gary,Ind. U5 ....7.75
Geneva,Utah C11 ....7.75
Houston S5 ....7.85
Ind.Harbor,Ind. I-2, Y1.7.75
Johnstown,Pa. B2 ....7.80
KansasCity,Mo. S5 ....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 ....8.45
Munhall,Pa. U5 ....7.75
Seattle B3 ....8.50
S.Chicago,Ill. U5, W14..7.75
S.SanFrancisco B3 ....8.40
Struthers,O. Y1 ....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 ....7.75
S.Chicago,Ill. U5 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.325
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 ....5.275
S.Chicago,Ill. U5 ....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 ....6.225
S.Chicago,Ill. U5 ....6.225
Weirton,W.Va. W6 ....6.225

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.10
Aliquippa,Pa. J5 ....5.10
Ashland,Ky.(15) A10 ..5.10
Atlanta A11 ....5.30
Bessemer,Ala. T2 ....5.10
Clairton,Pa. U5 ....5.10
Claymont,Del. C22 ....5.10
Cleveland J5, R2 ....5.20
Coatesville,Pa. L7 ....5.10
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 ....5.20
Fairfield,Ala. T2 ....5.10
Fontana,Calif.(30) K1 ..5.90
Gary,Ind. U5 ....5.10
Geneva,Utah C11 ....5.10
GraniteCity,Ill. G4 ....5.30
Harrisburg,Pa. P4 ....5.10
Houston S5 ....5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Johnstown,Pa. B2 ....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 ....5.20
Mansfield,O. E6 ....5.10
Minnequa,Colo. C10 ....5.95
Munhall,Pa. U5 ....5.10
Newport,Ky. A2 ....5.10
Pittsburgh J5 ....5.10
Riverdale,Ill. A1 ....5.10
Seattle B3 ....6.00
Sharon,Pa. S3 ....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 ....5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 ....5.10
Youngstown U5, Y1 ....5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....6.75
Fontana,Calif. K1 ....7.55
Geneva,Utah C11 ....6.75
Houston S5 ....6.85
Johnstown,Pa. B2 ....6.75
SparrowsPoint,Md. B2 ..6.75

PLATES, Wrought Iron
Economy,Pa. B14 ....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.625
Bessemer,Ala. T2 ....7.625
Clairton,Pa. U5 ....7.625
Claymont,Del. C22 ....7.625
Cleveland J5, R2 ....7.625
Coatesville,Pa. L7 ....7.925
Conshohocken,Pa. A3 ..7.625
Economy,Pa. B14 ....7.625
Ecorse,Mich. G5 ....7.725
Fairfield,Ala. T2 ....7.625
Farrell,Pa. S3 ....7.625
Fontana,Calif.(30) K1 ..8.425
Gary,Ind. U5 ....7.625
Geneva,Utah C11 ....7.625
Houston S5 ....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 ....7.625
Munhall,Pa. U5 ....7.625
Pittsburgh J5 ....7.625
Seattle B3 ....8.525
Sharon,Pa. S3 ....7.625
S.Chicago,Ill. U5, W14 ..7.625
SparrowsPoint,Md. B2..7.625
Warren,O. R2 ....7.625
Youngstown U5 ....7.625

PLATES, ALLOY
Aliquippa,Pa. J5 ....7.20
Claymont,Del. C22 ....7.20
Coatesville,Pa. L7 ....7.20
Economy,Pa. B14 ....7.20
Fontana,Calif. K1 ....8.00
Gary,Ind. U5 ....7.20
Houston S5 ....7.30
Ind.Harbor,Ind. Y1 ....7.20
Johnstown,Pa. B2 ....7.20
Lowellville,O. S3 ....7.20
Munhall,Pa. U5 ....7.20
Newport,Ky. A2 ....7.20
Pittsburgh J5 ....7.20
Seattle B3 ....8.10
Sharon,Pa. S3 ....7.20
S.Chicago,Ill. U5, W14..7.20
SparrowsPoint,Md. B2 ..7.20
Youngstown Y1 ....7.20

FLOOR PLATES
Cleveland J5 ....6.175
Conshohocken,Pa. A3 ..6.175
Ind.Harbor,Ind. I-2 ....6.175
Munhall,Pa. U5 ....6.175
S.Chicago,Ill. U5 ....6.175

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..5.35
Ashland l.c.l.(15) A10..5.85
Cleveland c.l. R2 ....5.85
Warren,O. c.l. R2 ....5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.425
Aliquippa,Pa.(9) J5 ..5.425
Alton,Ill. L1 ....5.625
Atlanta(9) A11 ....5.625
Bessemer,Ala.(9) T2 ..5.425
Birmingham(9) C15 ....5.425
Buffalo(9) R2 ....5.425
Clairton,Pa.(9) U5 ....5.425
Cleveland(9) R2 ....5.425
Ecorse,Mich.(9) G5 ....5.525
Emeryville,Calif. J7 ....6.175
Fairfield,Ala.(9) T2 ....5.425
Fairless,Pa.(9) U5 ....5.575
Fontana,Calif.(9) K1 ..6.125
Gary,Ind.(9) U5 ....5.425
Houston(9) S5 ....5.675
Ind.Harbor(9) I-2, Y1..5.425
Johnstown,Pa.(9) B2 ..5.425
Joliet,Ill. P22 ....5.425
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
LosAngeles(9) B3 ....6.125
Midland,Pa.(23) C18 ..5.725
Milton,Pa. M18 ....5.575
Minnequa,Colo. C10 ....5.875
Niles,Calif. P1 ....6.125
N.T'wanda,N.Y.(23)B11 5.775
Owensboro,Ky.(9) G8 ..5.425
Pittsburg,Calif.(9) C11..6.125
Pittsburgh(9) J5 ....5.425
Portland,Oreg. O4 ....6.175
Seattle B3, N14 ....6.175
S.Ch'c'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5..5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.425
Sterling,Ill.(9) N15 ...5.525
Struthers,O.(9) Y1 ....5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11..6.125
Youngstown(9) R2, U5 5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 ....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.475
Bethlehem,Pa. B2 ....6.475
Bridgeport,Conn. C32 ...6.55
Buffalo R2 ....6.475
Canton,O. R2, T7 ....6.475
Clairton,Pa. U5 ....6.475
Detroit S41 ....6.475
Economy,Pa. B14 ....6.475
Ecorse,Mich. G5 ....6.575
Fairless,Pa. U5 ....6.625
Farrell,Pa. S3 ....6.475
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 ....6.475
Houston S5 ....6.725
Ind.Harbor,Ind. I-2, Y1..6.475
Johnstown,Pa. B2 ....6.475
KansasCity,Mo. S5 ....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 ....6.475
LosAngeles B3 ....7.525
Massillon,O. R2 ....6.475
Midland,Pa. C18 ....6.475
Owensboro,Ky. G8 ....6.475
Pittsburgh J5 ....6.475
Sharon,Pa. S3 ....6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 ....6.475
Struthers,O. Y1 ....6.475
Warren,O. C17 ....6.475
Youngstown U5 ....6.475

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....7.925
Bessemer,Ala. T2 ....7.925
Bethlehem,Pa. B2 ....7.925
Clairton,Pa. U5 ....7.925
Cleveland R2 ....7.925
Ecorse,Mich. G5 ....8.025
Fairfield,Ala. T2 ....7.925
Fontana,Calif. K1 ....8.625
Gary,Ind. U5 ....7.925
Houston S5 ....8.175
Ind.Harbor,Ind. Y1 ....7.925
Johnstown,Pa. B2 ....7.925
KansasCity,Mo. S5 ....8.175
Lackawanna,N.Y. B2 ..7.925
LosAngeles B3 ....8.625
Pittsburgh J5 ....7.925
Seattle B3 ....8.675
S.Chicago,Ill. U5, W14..7.925
S.Duquesne,Pa. U5 ....7.925
S.SanFrancisco B3 ....8.675
Struthers,O. Y1 ....7.925
Youngstown U5 ....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 ....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
Sterling,Ill. N15 ....5.525
Sterling,Ill.(1) N15 ...5.425
Tonawanda,N.Y. B12 ..5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....5.425
Atlanta A11 ....5.625
Joliet,Ill. P22 ....5.425
Niles,Calif. P1 ....6.125
Pittsburgh J5 ....5.425
Portland,Oreg. O4 ....6.175
SanFrancisco S7 ....6.275
Seattle B3 ....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.55
Clairton,Pa. U5 ....6.55
Gary,Ind. U5 ....6.55
Houston S5 ....6.80
KansasCity,Mo. S5 ....6.80
Pittsburgh J5 ....6.55
Youngstown U5 ....6.55

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ....9.925
BeaverFalls,Pa. M12...9.925
Camden,N.J. P13 ....10.10
Chicago W18 ....9.925
Cleveland C20 ....9.925*
Elyria,O. W8 ....9.925
LosAngeles P2, S30 ..11.40*
Monaca,Pa. S17 ....9.925
Newark,N.J. W18 ....10.10
SpringCity,Pa. K3 ....10.10
Warren,O. C17 ....9.925

*Grade A; add 0.50c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.30
BeaverFalls,Pa. M12,R2.7.30
Birmingham C15 ....7.90
Buffalo B5 ....7.35
Camden,N.J. P13 ....7.75
Carnegie,Pa. C12 ....7.30
Chicago W18 ....7.30
Cleveland A7, C20 ....7.30
Detroit B5, P17 ....7.50
Detroit S41 ....7.30
Donora,Pa. A7 ....7.30
Elyria,O. W8 ....7.30
FranklinPark,Ill. N5 ...7.30
Gary,Ind. R2 ....7.30
GreenBay,Wis. F7 ....7.30
Hammond,Ind. J5, L2 ...7.30
Hartford,Conn. R2 ....7.80
Harvey,Ill. B5 ....7.30
LosAngeles(49) S30 ....8.75
LosAngeles P2, R2 ....8.75
Mansfield,Mass. B5 ....7.85
Massillon,O. R2, R8 ....7.30
Midland,Pa. C18 ....7.30
Monaca,Pa. S17 ....7.30
Newark,N.J. W18 ....7.75
NewCastle,Pa.(17) B4 ..7.30
Pittsburgh J5 ....7.30
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 ....7.85
Readville,Mass. C14 ....7.85
S.Chicago,Ill. W14 ....7.30
SpringCity,Pa. K3 ....7.75
Struthers,O. Y1 ....7.30
Warren,O. C17 ....7.30
Willimantic,Conn. J5 ....7.80
Waukegan,Ill. A7 ....7.30
Youngstown F3, Y1 ....7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 ..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa. M12,R2 8.775
Bethlehem,Pa. B2 ....8.775
Bridgeport,Conn. C32 ..8.925
Buffalo B5 ....8.775
Camden,N.J. P13 ....8.95
Canton,O. T7 ....8.775
Carnegie,Pa. C12 ....8.775
Chicago W18 ....8.775
Cleveland A7, C20 ....8.775
Detroit B5, P17 ....8.975
Detroit S41 ....8.775
Donora,Pa. A7 ....8.775
Elyria,O. W8 ....8.775
FranklinPark,Ill. N5 ...8.775
Gary,Ind. R2 ....8.775
GreenBay,Wis. F7 ....8.775
Hammond,Ind. J5, L2..8.775
Hartford,Conn. R2 ....9.075
Harvey,Ill. B5 ....8.775
Lackawanna,N.Y. B2 ..8.775
LosAngeles P2, S30 ...10.75
Mansfield,Mass. B5 ..9.075
Massillon,O. R2, R8 ...8.775
Midland,Pa. C18 ....8.775
Monaca,Pa. S17 ....8.775
Newark,N.J. W18 ....8.95
Plymouth,Mich. P5 ....8.975
S.Chicago,Ill. W14 ....8.775
SpringCity,Pa. K3 ....8.95
Struthers,O. Y1 ....8.775
Warren,O. C17 ....8.775
Waukegan,Ill. A7 ....8.775
Willimantic,Conn. J5 ...9.075
Worcester,Mass. A7 ....9.075
Youngstown F3, Y1 ....8.775

BARS, Reinforcing (To Fabricators)

AlabamaCity,Ala. R2 ..5.425
Atlanta A11 .....5.425
Birmingham C15 .....5.425
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ..6.175
Fairfield,Ala. T2 .....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 .....6.125
Ft.Worth,Tex.(4)(26)T45.875
Gary,Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1 5.425
Johnstown,Pa. B2 .....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ...5.675
Kokomo,Ind. C16 .....5.525
Lackawanna,N.Y. B2 ..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ..6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2 .5.425
Sterling,Ill.(1) N15 ..5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..6.00
Torrance,Calif. C11 ..6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2, U8 .....7.65
Chicago U8 .....6.91
Cleveland U8 .....6.89
Houston S5 .....7.35
Johnstown,Pa. B2 ....7.08
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Philadelphia U8 .....7.38
Pittsburgh J5, U8 .....7.10
SandSprings,Okla. S5 ...7.60
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 ...7.08
St.Paul U8 .....7.92
Williamsport,Pa. S19 ..7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy,(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.325
ChicagoHts.(4)(44) I-2 5.425
ChicagoHts.(4) C2 ...5.425
Franklin,Pa. (3) F5 ..5.325
Franklin,Pa. (4) F5 ..5.425
JerseyShore,Pa.(3), J8 ..5.30
Marion,O. (3) P11 ...5.325
Tonawanda(3) B12 ..5.325
Tonawanda(4) B12 ....6.00
Williamsport,Pa.(3) S19 5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10 ...4.925
Cleveland J5, R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fairless,Pa. U5 .....4.975
Fontana,Calif. K1 ....5.675
Gary,Ind. U5 .....4.925
Geneva,Utah C11 ....5.025
GraniteCity,Ill.(8) G4 ..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2 .4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ...4.925
Niles,O. M21, S3 .....4.925
Pittsburg,Calif. C11 ..5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 ....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2 .4.925
Steubenville,O. W10 ..4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5, Y1 ..4.925

SHEETS, H.R.(19) Ga. & Lighter

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ..8.10

SHEETS, H.R.(14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 ....7.275
Fairless,Pa. U5 .....7.275
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 ....8.025
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna (35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5, W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2 ..7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ....7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ..6.05
Fontana,Calif. K1 ....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ....7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 ....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ....6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Cleveland J5, R2 ....8.975
Ecorse,Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ...10.275
Gary,Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna(37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint (38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.95	7.20
Canton,O. R2	6.95	7.45
Fairfield T2	6.95	7.20
Gary,Ind. U5	6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	6.95	7.20
Irvin,Pa. U5	6.95	7.20
Kokomo,Ind. C16	7.05	...
MartinsFry. W10	6.95	7.20
Pitts.,Calif. C11	7.70	...
Pittsburgh J5	6.95	...
SparrowsPt. B2	6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ... 7.20

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 ..6.60‡
Ashland,Ky. A10 .....6.60‡
Canton,O. R2 .....6.60‡
Dover,O. E6 .....6.60†
Fairfield,Ala. T2 .....6.60†
Gary,Ind. U5 .....6.60†
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ....6.60†
Irvin,Pa. U5 .....6.60†
Kokomo,Ind. C16 .....6.70‡
MartinsFerry,O. W10 ..6.60*
Middletown,O. A10 ....6.60†
Pittsburg,Calif. C11....7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ..6.60†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.175

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ..9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland (28) R2 ....7.425
Niles,O. (28) R2 .....7.425
Youngstown J5 .....7.275
Weirton,W.Va. W6 ..7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .9.25
Butler,Pa. A10 (type 2) 9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 ....6.625
Cleveland R2 .....6.625
Fairfield,Ala. T2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2, Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 .....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...8.65
Ind.Harbor,Ind. I-2 ..8.475
Yorkville,O. W10 .....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, R2, S3 ..7.00
Weirton,W.Va. W6 .....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.40

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D3 Dearborn Div., Sharon Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W.Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts.Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div. Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Div., H. K. Porter Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.925
Allenport,Pa. P7 .....4.925
Alton,Ill. L1 .....5.125
Ashland,Ky.(8) A10 ...4.925
Atlanta A11 .....4.925
Bessemer,Ala. T2 .....4.925
Birmingham C15 .....4.925
Buffalo(27) R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fontana,Calif. K1 .....5.675
Gary,Ind. U5 .....4.925
Ind.Harbor,Ind. I-2, Y1.4.925
Johnstown,Pa.(25) B2..4.925
Lackaw'na,N.Y.(25) B2 4.925
LosAngeles(25) B3 ....5.675
Minnequa,Colo. C10 ...6.025
Riverdale,Ill. A1 .....4.925
SanFrancisco S7 .....6.35
Seattle(25) B3 .....5.925
Seattle N14 .....6.35
Sharon,Pa. S3 .....4.925
S.Chicago W14 .....4.925
S.SanFrancisco(25) B3.5.675
SparrowsPoint,Md. B2..4.925
Sterling,Ill.(1) N15 ....4.925
Sterling,Ill. N15 .....5.025
Torrance,Calif. C11 ...5.675
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ...4.925
Youngstown U5 .....4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.10
Farrell,Pa. S3 .....8.10
Gary,Ind. U5 .....8.10
Houston S5 .....8.35
Ind.Harbor,Ind. Y1 ....8.10
KansasCity,Mo. S5 ....8.35
LosAngeles B3 .....9.30
Lowellville,O. S3 .....8.10
Newport,Ky. A2 .....8.10
Sharon,Pa. A2, S3 .....8.10
S.Chicago,Ill. W14 .....8.10
Youngstown U5, Y1 ....8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 .....7.325
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.425
Fairfield,Ala. T2 .....7.325
Farrell,Pa. S3 .....7.325
Gary,Ind. U5 .....7.325
Ind.Harbor,Ind. I-2, Y1.7.325
Lackawanna,N.Y. B2 ..7.325
LosAngeles(25) B3 ....8.075
Seattle(25) B3 .....7.325
Sharon,Pa. S3 .....7.325
S.Chicago,Ill. W14 .....7.325
S.SanFrancisco(25) B3 .8.075
SparrowsPoint,Md. B2..7.325
Warren,O. R2 .....7.325
Weirton,W.Va. W6 .....7.325
Youngstown U5, Y1 ...7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...5.175
Warren,O. R2 .....5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.15
Baltimore T6 .....7.15
Boston T6 .....7.70
Buffalo S40 .....7.15
Cleveland A7, J5 .....7.15
Conshohocken,Pa. A3 ..7.20
Dearborn,Mich. D3 .....7.25
Detroit D2, M1, P20 ...7.25
Dover,O. G6 .....7.15
Ecorse,Mich. G5 .....7.25
Evanston,Ill. M22 .....7.25
Follansbee,W.Va. F4 ...7.15
Fontana,Calif. K1 .....9.00
FranklinPark,Ill. T6 ...7.25
Ind.Harbor,Ind. Y1 ....7.15
Indianapolis J5 .....7.30
LosAngeles J5 .....9.05
LosAngeles C1 .....9.20
NewBedford,Mass. R10..7.60
NewBritain(10) S15 ....7.15
NewCastle,Pa. B4, E5 ..7.15
NewHaven,Conn. D2 ...7.60
NewKensington,Pa. A6..7.15
Pawtucket,R.I. R3 .....7.80
Pawtucket,R.I. N8 .....7.70
Philadelphia P24 .....7.70
Pittsburgh J5 .....7.15
Riverdale,Ill. A1 .....7.25
Rome,N.Y.(32) R6 .....7.15
Sharon,Pa. S3 .....7.15
Trenton,N.J.(31) R5 ....8.60
Wallingford,Conn. W2 ..7.60
Warren,O. R2, T5 .....7.15
Weirton,W.Va. W6 .....7.15
Worcester,Mass. A7 ....7.70
Youngstown J5, Y1 ....7.15

STRIP, Cold-Rolled Alloy

Boston T6 .....15.40
Carnegie,Pa. S18 .....15.05
Cleveland A7 .....15.05
Dover,O. G6 .....15.05
Farrell,Pa. S3 .....15.05
FranklinPark,Ill. T6 ...15.05
Harrison,N.J. C18 .....15.05
Indianapolis J5 .....15.20
Lowellville,O. S3 .....15.05
Pawtucket,R.I. N8 .....15.40
Riverdale,Ill. A1 .....15.05
Sharon,Pa. S3 .....15.05
Worcester,Mass. A7 ...15.35
Youngstown J5 .....15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.45
Dearborn,Mich. D3 ....10.60
Dover,O. G6 .....10.45
Ecorse,Mich. G5 .....10.60
Farrell,Pa. S3 .....10.50
Ind.Harbor,Ind. Y1 ....10.65
Sharon,Pa. S3 .....10.50
Warren,O. R2 .....10.45

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn.(10) S15	8.95	10.40	12.60	15.60	18.55
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	18.10	21.95	26.30
Buffalo W12	...	...	18.10	....	....
Fostoria,O. S1	...	...	18.30	22.15	....
FranklinPark,Ill. T6	...	...	18.45	22.30	26.65
Harrison,N.J. C18	...	...	18.10	21.95	26.30
New York W3	...	...	18.10	21.95	26.30
Palmer,Mass. W12	...	...	18.10	....	....
Trenton,N.J. R5	...	...	18.10	21.95	26.30
Worcester,Mass. A7, T6	...	...	18.10	21.95	26.30
Youngstown J5	...	...	18.45	22.30	26.65

Weirton,W.Va. W6 ....10.50
Youngstown Y1 .....10.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.90

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.15*
Dover,O. G6 .....7.15*
Evanston,Ill. M22 .....7.25*
Riverdale,Ill. A1 .....7.25*
Warren,O. B9, T5 ....7.15*
Worcester,Mass. A7 ...7.70*
Youngstown J5 .....7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....7.275

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Riverdale,Ill. A1 .....5.50
Sharon,Pa. S3 .....5.35
Youngstown U5 .....5.35

SILICON STEEL

H.R. SHEETS(22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed 1/2c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.35	12.05	13.15	14.20
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.825*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2	9.625†	10.85*	11.55*	12.65*	....
Mansfield,O. E6	9.625*	11.35	12.05	13.15	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10	....	11.35†	12.05	13.15	14.20
					Stator
Vandergrift,Pa. U5	....	....	....	....	7.85

H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	15.00	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	17.60	19.20	19.70	20.20	15.25††
Butler,Pa. A10	....	....	19.20	19.70	20.20	....
Vandergrift,Pa. U5	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed 1/2c lower. **Cut lengths, 3/4-cent lower. ††Coils only.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.05	$10.30
Fairfield,Ala. T2	10.15	10.40
Fairless,Pa. U5..	10.15	10.40
Fontana,Calif.K1	10.80	11.05
Gary,Ind. U5 ...	10.05	10.30
Ind.Harb. Y1 ..	10.05	10.30
Pitts.,Calif. C11.	10.80	11.05
Sp.Pt.,Md. B2 ..	10.15	10.40
Weirton,W.Va.W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.85
Fairfield,Ala. T2	7.95
Fairless,Pa. U5	7.95
Fontana,Calif. K1	8.60
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. I-2, Y1	7.85
Irvin,Pa. U5	7.85
Niles,O. R2	7.85
Pittsburg,Calif. C11	8.60
SparrowsPoint,Md. B2	7.95
Weirton,W.Va. W6	7.85
Yorkville,O. W10	7.85

HOLLOWARE ENAMELING (Black Plate (29 Gage)

Aliquippa,Pa. J5 .....$7.50
Gary,Ind. U5 .....7.50
GraniteCity,Ill. G4 .....7.60
Ind.Harbor,Ind. Y1 .....7.50
Irvin,Pa. U5 .....7.50
Yorkville,O. W10 .....7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5 .....$9.70
Irvin,Pa. U5 .....9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5 .....$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..7.65
Aliquippa,Pa. J5 .....7.65
Alton,Ill. L1 .....7.85
Atlanta A11 .....7.65
Bartonville,Ill. K4 .....7.75
Buffalo W12 .....7.65
Chicago W13 .....7.65
Cleveland A7, C20 .....7.65
Crawfordsville,Ind. M8..7.75
Donora,Pa. A7 .....7.65
Duluth A7 .....7.65
Fairfield,Ala. T2 .....7.65
Fostoria,O.(24) S1 .....7.75
Houston S5 .....7.90
Jacksonville,Fla. M8 ...8.00
Johnstown,Pa. B2 .....7.65
Joliet,Ill. A7 .....7.65
KansasCity,Mo. S5 .....7.90
Kokomo,Ind. C16 .....7.75
LosAngeles B3 .....8.60
Minnequa,Colo. C10 ....7.90
Monessen,Pa. P7, P16 ..7.65
N.Tonawanda,N.Y. B11.7.65
Palmer,Mass. W12 .....7.95
Pittsburg,Calif. C11 ....8.60
Portsmouth,O. P12 .....7.65
Rankin,Pa. A7 .....7.65
S.Chicago,Ill. R2 .....7.65
S.SanFrancisco C10 ....8.60
SparrowsPoint,Md. B2 ..7.75
Sterling,Ill.(1) N15 ....7.65
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....7.65
Waukegan,Ill. A7 .....7.65
Worcester,Mass. A7 ....7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 .....12.65
Buffalo W12 .....12.65
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....12.65
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....12.85
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 .....12.95
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 .....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ..12.75
Struthers,O. Y1 .....12.65
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 ....9.55
LosAngeles B3 .....10.25
Minnequa,Colo. C10 ....9.50
Monessen,Pa. P7, P16 ..9.30
New Haven,Conn. A7 ..9.60
Palmer,Mass. W12 .....9.60
Pittsburg,Calif. C11 ...10.25
Portsmouth,O. P12 .....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ...10.25
SparrowsPt.,Md. B2 ....9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester,Mass. A7 ....9.60

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Bartonville,Ill. K4 .....9.40
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Fostoria,O. S1 .....9.35
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 ....9.55
LosAngeles B3 .....10.25
Milbury,Mass.(12) N6 ..9.60
Minnequa,Colo. C10 ....9.50
Monessen,Pa. P7, P16..9.30
MuncieInd. I-7 .....9.50
Palmer,Mass.(12) W12..9.60
Pittsburg,Calif. C11 ...10.25
Portsmouth,O. P12 .....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ....10.25
SparrowsPt.,Md. B2 ....9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester A7, J4, T6...9.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....15.80
Bartonville,Ill. K4 ....15.70
Buffalo W12 .....15.60
Chicago W13 .....15.60
Cleveland A7 .....15.60
Crawfordsville,Ind. M8.15.70
Fostoria,O. S1 .....15.60
Houston S5 .....15.85
Jacksonville,Fla. M8 ..15.95
Johnstown,Pa. B2 .....15.60
KansasCity,Mo. S5 ....15.85
Kokomo,Ind. C16 .....15.60
Minnequa,Colo. C10 ....15.85
Monessen,Pa. P16 .....15.60
Muncie,Ind. I-7 .....15.80
Palmer,Mass. W12 .....15.90
S.SanFrancisco C10 ....16.45
Waukegan,Ill. A7 .....15.60
Worcester,Mass. A7, T6 15.90

ROPE WIRE (A)

Bartonville,Ill. K4 ....12.75
Buffalo W12 .....12.75
Fostoria,O. S1 .....12.75
Johnstown,Pa. B2 .....12.75
Monessen,Pa. P7 .....12.75
Muncie,Ind. I-7 .....12.95
Palmer,Mass. W12 ....13.05
Portsmouth,O. P12 ....12.75
Roebling,N.J. R5 .....13.05
SparrowsPt.,Md. B2 ..12.85
Struthers,O. Y1 .....12.75
Worcester,Mass. J4 ....13.05
(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

Bartonville,Ill. K4 ....16.55
Monessen,Pa. P16 ....16.55
Roebling,N.J. R5 ....17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6 ....11.65
Baltimore T6 ....11.95
Boston T6 ....11.95
Buffalo W12 ....11.65
Chicago W13 ....11.75
Cleveland A7 ....11.65
Crawfordsville,Ind. M8..11.65
Dover,O. G6 ....11.65
Fostoria,O. S1 ....11.65
FranklinPark,Ill. T6 ..11.75
Kokomo,Ind. C16 ....11.65
Massillon,O. R8 ....11.65
Milwaukee C23 ....11.85
Monessen,Pa. P7, P16..11.65
Palmer,Mass. W12 ....11.95
Pawtucket,R.I. N8 ....11.95
Philadelphia P24 ....11.95
Riverdale,Ill. A1 ....11.75
Rome,N.Y. R6 ....11.65
Sharon,Pa. S3 ....11.65
Trenton,N.J. R5 ....11.95
Warren,O. B9 ....11.65
Worcester,Mass. A7, T6 11.95

NAILS, Stock **Col.**

AlabamaCity,Ala. R2 ..173
Aliquippa,Pa. J5 173
Atlanta A11 175
Bartonville,Ill. K4 175
Chicago W13 173
Cleveland A9 173
Crawfordsville,Ind. M8..175
Donora,Pa. A7 173
Duluth A7 173
Fairfield,Ala. T2 173
Houston S5 178
Jacksonville,Fla.(20) M8.184
Johnstown,Pa. B2 173
Joliet,Ill. A7 173
KansasCity,Mo. S5 178
Kokomo,Ind. C16 175
Minnequa,Colo. C10 178
Monessen,Pa. P7 173
Pittsburg,Calif. C11 192
Rankin,Pa. A7 173
S.Chicago,Ill. R2 173
SparrowsPt.,Md. B2 175
Sterling,Ill.(7) N15 175
Worcester,Mass. A7 179

(To Wholesalers; per cwt)

Galveston,Tex. D7 ....$9.10

NAILS, Cut (100 lb keg)

To Dealers (33)

Conshohocken,Pa. A3 ..$9.80
Wheeling,W.Va. W10 ...9.80

POLISHED STAPLES **Col.**

AlabamaCity,Ala. R2 ...175
Aliquippa,Pa. J5 175
Atlanta A11 177
Bartonville,Ill. K4 177
Crawfordsville,Ind. M8 ..177
Donora,Pa. A7 175
Duluth A7 175
Fairfield,Ala. T2 175
Houston S5 180
Jacksonville,Fla.(20) M8 186
Johnstown,Pa. B2 175
Joliet,Ill. A7 175
KansasCity,Mo. S5 180
Kokomo,Ind. C16 177
Minnequa,Colo. C10 180
Pittsburg,Calif. C11 194
Rankin,Pa. A7 175
S.Chicago,Ill. R2 175
SparrowsPt., Md. B2 177
Sterling,Ill.(7) N15 175
Worcester,Mass. A7 181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150

AlabamaCity,Ala. R2.$10.26
Atlanta A11 ....10.36
Bartonville,Ill. K4 ....10.36
Buffalo W12 ....10.26
Chicago W13 ....10.26
Crawfordsville,Ind. M8.10.36
Donora,Pa. A7 ....10.26
Duluth A7 ....10.26
Fairfield,Ala. T2 ....10.26
Houston S5 ....10.51
Jacksonville,Fla. M8 ..10.82
Johnstown,Pa. B2 ....10.26
Joliet,Ill. A7 ....10.26
KansasCity,Mo. S5 ....10.51
Kokomo,Ind. C16 ....10.36
LosAngeles B3 ....11.05
Minnequa,Colo. C10 ....10.51
Pittsburg,Calif. C11 ....11.04
S.Chicago,Ill. R2 ....10.26
S.SanFrancisco C10 ...11.04
SparrowsPt., Md. B2 ..10.36
Sterling,Ill.(37) N15 ..10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2 .$10.60
Atlanta A11 ....10.70
Bartonville,Ill. K4 ....10.70
Buffalo W12 ....10.60
Chicago W13 ....10.60
Crawfordsville,Ind. M8.10.70
Donora,Pa. A7 ....10.60
Duluth A7 ....10.60
Fairfield,Ala. T2 ....10.60
Houston S5 ....10.85
Jacksonville,Fla. M8 ..11.16
Johnstown,Pa. B2 ....10.60
Joliet,Ill. A7 ....10.60
KansasCity,Mo. S5 ....10.85
Kokomo,Ind. C16 ....10.70
LosAngeles B3 ....11.40
Minnequa,Colo. C10 ..10.85
Pittsburg,Calif. C11 ..11.40
S.Chicago,Ill. R2 ....10.60
S.SanFrancisco C10 ..11.40
SparrowsPt.,Md. B2 ..10.70
Sterling,Ill.(37) N15 ..10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2..$10.65
Atlanta A11 ....10.75
Bartonville,Ill. K4 ....10.75
Buffalo W12 ....10.65
Chicago W13 ....10.65
Crawfordsville,Ind. M8.10.75
Donora,Pa. A7 ....10.65
Duluth A7 ....10.65
Fairfield,Ala. T2 ....10.65
Houston S5 ....10.90
Jacksonville,Fla. M8 ..11.21
Johnstown,Pa. B2 ....10.65
Joliet,Ill. A7 ....10.65
KansasCity,Mo. S5 ....10.90
Kokomo,Ind. C16 ....10.75
LosAngeles B3 ....11.45
Minnequa,Colo. C10 ....10.90
Pittsburg,Calif. C11 ....11.45
S.Chicago,Ill. R2 ....10.65
S.SanFrancisco C10 ....11.45
SparrowsPt.,Md. B2 ....10.75
Sterling,Ill.(37) N15 ..10.75

BALE TIES, Single Loop **Col.**

AlabamaCity,Ala. R2 ..212
Atlanta A11 214
Bartonville,Ill. K4 214
Crawfordsville,Ind. M8 ..214
Donora,Pa. A7 212
Duluth A7 212
Fairfield,Ala. T2 212
Houston S5 217
Jacksonville,Fla. M8 219
Joliet,Ill. A7 212
KansasCity,Mo. S5 217
Kokomo,Ind. C16 214
Minnequa,Colo. C10 217
Pittsburg,Calif. C11 236
S.SanFrancisco C10 236
SparrowsPt.,Md. B2 214
Sterling,Ill.(7) N15 214

FENCE POSTS

Birmingham C15 172
ChicagoHts., Ill. C2, I-2..172
Duluth A7 172
Franklin,Pa. F5 172
Huntington,W.Va. C15 ..172
Johnstown,Pa. B2 172
Marion,O. P11 172
Minnequa,Colo. C10 177
Sterling,Ill.(1) N15 172
Tonawanda,N.Y. B12 ..174

WIRE, Barbed **Col.**

AlabamaCity,Ala. R2..193**
Aliquippa,Pa. J5 ....190§
Atlanta A11 ....198*
Bartonville,Ill. K4 198
Crawfordsville,Ind. M8 ..198
Donora,Pa. A7 ....193†
Duluth A7 ....193†
Fairfield,Ala. T2 ....193†
Houston S5 ....198**
Jacksonville,Fla. M8 203
Johnstown,Pa. B2 ....196§
Joliet,Ill. A7 ....193†
KansasCity,Mo. S5 ...198**
Kokomo,Ind. C16 ....195†
Minnequa,Colo. C10 ..198**
Monessen,Pa. P7 ....196§
Pittsburg,Calif. C11 ....213†
Rankin,Pa. A7 ....193†
S.Chicago,Ill. R2 ....193**
S.SanFrancisco C10 ..213**
SparrowsPoint,Md. B2..198§
Sterling,Ill.(7) N15 ....198††

WOVEN FENCE, 9-15 Ga. **Col.**

Ala.City,Ala. R2 ....187**
Aliq'ppa,Pa.9-14½ga.J5 190§
Atlanta A11 ....192*
Bartonville,Ill. K4 192
Crawfordsville,Ind. M8 ..192
Donora,Pa. A7 ....187†
Duluth A7 ....187†
Fairfield,Ala. T2 ....187†
Houston S5 ....192**
Jacksonville,Fla. M8 197
Johnstown,Pa.(43) B2 ..190§
Joliet,Ill. A7 ....187†
KansasCity,Mo. S5 ....192**
Kokomo,Ind. C16 ....189†
Minnequa,Colo. C10 ..192**
Pittsburg,Calif. C11 ....210†
Rankin,Pa. A7 ....187†
S.Chicago,Ill. R2 ....187**
Sterling,Ill.(7) N15 ...192††

WIRE (16 gage)	An'ld Galv. Stone	Stone
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa. J5	.17.15	18.95
Bartonville K4	..17.25	19.05
Cleveland A7	...17.15	....
Crawf'dsville M8	17.25	19.05
Fostoria,O. S1	..17.65	19.20†
Houston S5	..17.40	18.95**
Jacksonville M8	17.50	19.30
Johnstown B2	..17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo C16	..17.25	18.80†
Minnequa C10	..17.40	18.95**
P'lm'r,Mass.W12	17.45	19.00†
Pitts.,Calif. C11	.17.50	19.05†
SparrowsPt.	B2..17.25	19.05§
Sterling(37)N15	17.25	19.05††
Waukegan A7	..17.15	18.70†
Worcester A7	..17.45	....

WIRE, Merchant Quality (6 to 8 gage) An'ld Galv.

Ala.City,Ala. R2.8.65 9.20**
Aliquippa J5 ....8.65 9.325§
Atlanta(48) A11..8.75 9.425*
Bartonville(48) K4 8.75 9.425
Buffalo W12 ....8.65 9.20†
Cleveland A7 ....8.65 ....
Crawfordsville M8 8.75 9.425
Donora,Pa. A7 ..8.65 9.20†
Duluth A7 ....8.65 9.20†
Fairfield T2 ....8.65 9.20†
Houston(48) S5 ..8.90 9.45**
Jacks'ville,Fla. M8 9.00 9.675
Johnstown B2(48) 8.65 9.325§
Joliet,Ill. A7 ....8.65 9.20†
Kans.City(48) S5 8.90 9.45**
Kokomo C16 ....8.75 9.30†
LosAngeles B3 ..9.60 10.275§
Minnequa C10 ...8.90 9.45**
Monessen P7(48)..8.65 9.325§
Palmer,Mass. W12 8.95 9.50†
Pitts.,Calif. C11..9.60 10.15†
Rankin,Pa. A7 ..8.65 9.20†
S.Chicago R2 ...8.65 9.20**
S.SanFran. C10..9.60 10.15**
Spar'wsPt.B2(48) 8.75 9.425§
Sterling(48) N15 8.90 9.575††
Sterling(1) (48) ..8.80 9.475††
Struthers,O. Y1 ...8.65 9.30‡
Worcester,Mass.A7 8.95 9.50†

Based on zinc price of: *13.50. †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)
½ in. and smaller:
6 in. and shorter ... 49.0
Longer than 6 in. .. 39.0
⅝ in. thru 1 in.:
6 in. and shorter .. 39.0
Longer than 6 in. .. 35.0
1⅛ in. and larger:
All lengths 35.0
Undersized Body (rolled thread)
½ in. and smaller:
6 in. and shorter.. 49.0

Carriage, Machine, Lag Bolts

Hot Galvanized:
½ in. and smaller:
6 in. and shorter.. 29.0
Longer than 6 in... 15.0
⅝ in. and larger:
All lengths 12.0

Lag Bolts (all diam.)
6 in. and shorter.. 49.0
Longer than 6 in... 39.0

Plow and Tap Bolts
½ in. and smaller by 6 in. and shorter .. 49.0
Larger than ½ in. or longer than 6 in... 39.0

Blank Bolts 39.0

Step, Elevator, Tire Bolts 49.0

Stove Bolts, Slotted:
⅛ to ¼ in. incl., 3 in. and shorter. 55.0
⅛ to ½ in., inclusive 55.0

NUTS

Reg. & Heavy Square Nuts:
All sizes 55.5

Square Nuts, Reg. & Heavy, Hot Galvanized:
All sizes 41.0

Hex Nuts, Reg. & Heavy, Hot Pressed:
¾ in. and smaller.. 60.5
⅞ in. to 1 in., incl. 55.5
1⅛ in. to 1½ in., incl. 58.5
1⅝ in. and larger.. 53.5

Hex Nuts, Reg. & Heavy, Cold Punched:
¾ in. and smaller.. 60.5
⅞ in. to 1½ in., incl. 55.5
1⅝ in. and larger.. 53.5

Hex Nuts, All Types, Hot Galvanized:
¾ in. and smaller.. 46.5
⅞ in. to 1 in., incl. 41.5
1⅛ in. to 1½ in., incl. 46.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):
¾ in. and smaller.. 60.5
⅞ in. to 1½ in., incl. 55.5
1⅝ in. and larger.. 53.5

Hex Nuts, Finished (Incl. Slotted and Castellated):
1 in. and smaller.. 63.0
1⅛ in. to 1½ in., incl. 59.0
1⅝ in. and larger.. 53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):
⅝ in. and smaller.. 60.5
¾ in. to 1 in., incl. 63.0
1⅛ in. to 1½ in., incl. 59.0
1⅝ in. and larger.. 53.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:

6 in. and shorter:
⅝ in. and smaller.. 40.0
¾, ⅞, and 1 in. diam. 22.0
Longer than 6 in.:
⅝ in. and smaller.. 8.0
¾, ⅞, and 1 in. diam. .....+ 6.0

High Carbon, Heat Treated:

6 in. and shorter:
⅝ in. and smaller.. 26.0
¾, ⅞, and 1 in. diam. 3.0
Longer than 6 in.:
⅝ in. and smaller..+13.0
¾, ⅞, and 1 in. diam. .....+32.0

Flat Head Capscrews:
¾ in. and smaller..+76.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter.. Net
Longer than 6 in...+23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.25
7/8 in. under: List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2¼	12	46.99	55.06	41.81
2½	12	51.76	60.65	46.05
2¾	12	56.04	65.67	49.88
3	12	59.76	70.03	53.19

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Tee Rails All	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	....
Huntington,W.Va. C15	....	....	....	6.50
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	....
Johnstown,Pa. B2	....	....	...(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	....
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES

Fairfield,Ala. T2 .....6.60
Gary,Ind. U5 .....6.60
Ind.Harbor,Ind I-2 ....6.60
Lackawanna,N.Y. B2 ..6.60
Minnequa,Colo. C10 ....6.60
Seattle B3 .....6.75
Steelton,Pa. B2 .....6.60
Torrance,Calif. C11 ....6.75

JOINT BARS

Bessemer,Pa. U5 .....6.975
Fairfield,Ala. T2 ....6.975
Ind.Harbor,Ind. I-2 ...6.975
Joliet,Ill. U5 .....6.975
Lackawanna,N.Y. B2..6.975
Minnequa,Colo. C10 ...6.975
Steelton,Pa. B2 .....6.975

AXLES

Ind.Harbor,Ind. S13 ...8.775
Johnstown,Pa. B2 ....8.775

TRACK BOLTS, Untreated

Cleveland R2 .....14.75
KansasCity,Mo. S5 .....14.75
Lebanon,Pa. B2 .....14.75
Minnequa,Colo. C10 ....14.75
Pittsburgh P14 .....14.75
Seattle B3 .....15.25

SCREW SPIKES

Lebanon,Pa. B2 .....14.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2 .....9.75
Ind.Harbor,Ind. I-2, Y1 9.75
KansasCity,Mo. S5 ....9.75
Lebanon,Pa. B2 .....9.75
Minnequa,Colo. C10 ....9.75
Pittsburgh J5 .....9.75
Seattle B3 .....10.25
S.Chicago,Ill. R2 .....9.75
Struthers,O. Y1 .....9.75
Youngstown R2 .....9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) 3/8" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.30c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	+8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	−1.5	14.75	−1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	14.75	−1.5	14.75	−1.5	4.25	+12.5	4.25	+12.5
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Lorain, O. N3	14.75	0.25	15.25	0.75	15.75	−0.5	15.25	−0.5	5.25	+11.5	5.25	+11.5
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	16.75	0.5	16.75	0.5	....	....	....	....
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	14.75	−1.5	14.75	−1.5	4.25	+12.5	4.25	+12.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
					16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	40.00	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.25
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	46.00	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.00	55.00
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	62.75
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	77.50	....	86.50	91.00	92.75	99.00	104.25
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	80.75	80.75
316L	....	55.50	70.00	76.50	77.00	80.75	84.50	89.25	88.50
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	52.50	52.50	55.50	59.75	65.50	65.50
330	....	....	106.75	....	95.25	106.75	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.00	48.25	48.25
420	26.00	33.50	34.25	41.75	39.25	41.25	45.25	52.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	42.00
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels Inc.; U. S. Steel Corp.; Universal-Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	39.75
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.50	49.50	54.50	58.25
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.00	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.10	38.75

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.305	Cr-Hot Work	0.475
Extra Carbon	0.360	W-Cr Hot Work	0.500
Special Carbon	0.475	V-Cr Hot Work	0.520
Oil Hardening	0.0475	Hi-Carbon-Cr	0.925

Grade by Analysis (%)

W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	....	....	4.285
18.25	4.25	1	4.75	....	....	2.500
18	4	2	9	....	....	2.870
18	4	2	....	....	....	1.960
18	4	1	....	....	....	1.795
9	3.5	....	....	....	....	1.395
13.5	4	3	....	....	....	2.060
13.75	3.75	2	5	....	....	2.440
6.4	4.5	1.9	....	5	....	1.300
6	4	3	....	6	....	1.545
1.5	4	1	....	8.5	....	1.155

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	66.50	66.50	67.00
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon,Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	68.00	68.50	69.00	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark,N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,Ohio, deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry. $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	78.50
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	82.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	8.59§	9.86§	....	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.78	....	8.76	9.06	11.34 #	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	11.07	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	53.50	9.42	9.73	12.90 #	15.28	9.63	9.72	11.20
Buffalo	8.40	9.00	10.07	55.98	8.50	8.80	10.90 #	15.00	8.90	8.90	10.45
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.20	9.45	10.10	53.00	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.10	52.43	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	10.20	52.32	8.33	8.69	10.80 #	14.74	9.01	8.79	10.11
Dallas	8.85	10.15	....	....	9.00	8.95	11.01	....	9.00	9.45	10.70
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.43	9.70	10.45	56.50	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	7.10	8.40	8.45	54.32	7.25	7.20	11.10	13.50	7.25	7.70	8.95
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	8.50	10.75	11.65	57.60	8.55	8.55	12.00	....	8.60	8.55	9.95
Memphis, Tenn.	8.55	9.80	....	....	8.60	8.97	11.96 #	....	9.01	8.93	10.56
Milwaukee	8.33	9.58	10.23	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.35	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	53.08	9.31	9.57	12.76 #	15.09	9.35	9.43	10.71
Norfolk, Va.	8.40	....	....	....	9.10	9.10	12.00	....	9.40	8.85	10.35
Philadelphia	8.00	8.90	9.92	52.69	8.67	8.65	11.51 #	15.01	8.50	8.75	9.75**
Pittsburgh	8.18	9.45	10.45	52.00	8.33	8.60	10.80 #	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.38	9.55	8.65	14.50	15.95	8.65	8.30	11.50
Richmond, Va.	8.40	....	10.40	....	9.10	9.00	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.46	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.71	....	8.84	9.21	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	55.10	9.45	9.70	13.00	16.10	9.50	9.60	12.00
Seattle	9.95	11.15	12.00	57.38	10.00	10.10	14.05	16.35	9.80	9.70	12.10
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	9.95	11.15	12.00	57.38	10.00	10.10	14.05	17.20	9.80	9.70	12.10
Washington	8.88	....	....	....	9.36	9.56	10.94	....	9.79	9.26	10.74

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.; #1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [3]—400 to 9999 lb; [8]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $150; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa. Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Snow Shoe, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Snow Shoe, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $33-34; Mexican, all rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Ores

Lake Superior Iron Ore

(Prices effective for the 1958 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic concentrates	62-64% 25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	27.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$11.80-$12.20*
Domestic, concentrates f.o.b. milling points	20.00

*Before duty.

Manganese Ore

Mn 46-48%, Indian (export tax included), $135 per long ton unit, c.i.f. U. S. ports, duty for buyer's account: other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$50.00
48% 2.8:1	48.00
48% no ratio	39.00

South African Transvaal

48% no ratio	$37.00
44% no ratio	27.00

Turkish

48% 3:1	$55.00

Domestic

Rail nearest seller

18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.60
60-65%	2.60-2.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi River, ocean bags 23,000 lb and over.. F.o.b. Riverton or Camden, N. J., west of Mississippi River.	10.50 9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over	10.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe..	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum, freight allowed Carlots Ton lots	39.50 41.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	30.30-45.70†
Bronze, 5000-lb lots	45.70-49.80†
Copper: Electrolytic Reduced	14.75* 14.75*
Lead	7.50*
Manganese: Minus 35 mesh Minus 100 mesh Minus 200 mesh	64.00 70.00 75.00
Nickel, unannealed	$1.15
Nickel-Silver, 5000-lb lots	47.80-52.60†
Phosphor-Copper, 5000-lb lots	57.80
Copper (atomized) 5000-lb lots	38.30-46.80‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.07
Stainless Steel, 316	$1.26
Tin	14.50*
Zinc, 5000-lb lots	17.50-30.70‡

Tungsten:	Dollars
Melting grade, 99% 60 to 200 mesh, nominal; 1000 lb and over..	3.15
Less than 1000 lb ..	3.30
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Length	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.45
Saginaw, Mich., deld.	34.03
Erie, Pa., ovens	30.50
Everett, Mass., ovens: New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Neville Island (Pittsburgh), Pa., ovens	29.25
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
St. Paul, ovens	29.75
Chicago, deld.	33.29
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.85 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg	29.50
Industrial xylene	32.00-34.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00-34.00

Cents per pound, producing point

Phenol: Grade 1, 17.50; Grade 2-3, 15.50; Grade 4, 17.50; Grade 5, 16.50; Grade 6, 14.50.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries.)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.53	$5.33	$5.33	$5.73
Bar Size Angles	5.73	5.58	5.58	5.99
Structural Angles	5.73	5.58	5.58	5.99
I-Beams	5.88	5.72	5.72	6.02
Channels	5.88	5.72	5.72	6.02
Plates (basic bessemer)	6.79	6.62	6.62	6.94
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.71	25.59	25.59	26.46
Barbed Wire (†)	6.65	6.65	6.65	7.00
Merchant Bars	6.23	6.07	6.07	6.43
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails ($)	8.02	8.02	7.92	8.20

†Per 82 lb. net, reel. $Per 100-lb kegs, 20d nails and heavier.

Moltrup Steel

COLD DRAWN

Service "out of this world"

...through your *local* Steel Service Center

Warehousing steel via outer space is quite fantastic. But realistic indeed is today's down-to-earth concept of space, time and money you can save through your local steel distributor.

No need to tie up capital and storage space for steel inventories. Reduce handling and processing equipment. Eliminate extra scrap and wastage. Stop paying interest, taxes and insurance on steel stocks that may become obsolete.

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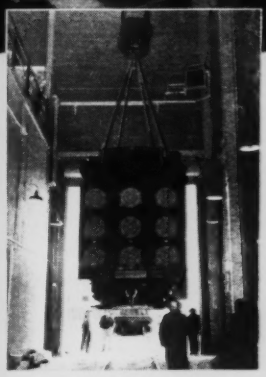
W 2

Consult telephone directory, in cities listed, or ask us for name of distributor nearest you.

Phone: Beaver Falls—730.

Moltrup Steel Products Co.

BEAVER FALLS, PA.



Yellow Strand Braided Safety Slings — like this one — are available with adjustable legs to permit handling various size loads. These extra-flexible slings safely lift equipment that is easily damaged.

Finished Product or Raw Material

Yellow Strand Braided Safety Slings lift this heavy electric transformer. B & B Slings are designed for great strength and flexibility — yet are light in weight, easily handled.

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Wire Rope

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MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa., 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton: $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively. (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.05% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2% from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38.43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.
Cr 67.71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025 max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 61-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.05c per lb of contained Cr. Packed, c.l. 31.65c, ton 33.45c, less ton 34.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, SM x D, 21.25c, per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" down, 27.50c per lb contained Cr, 14.20c per lb contained Si. 0.75" x down, 28.65c per lb contained Cr, 14.20c per lb contained Si. Delivered.

Chromium Metal Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ¾" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C, 0.20% max) $3.40. **Grainal:** Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 14.20c per lb of contained Si. Packed c.l. 16.70c, ton lot 18.15c, less ton 19.80c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.
65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c, per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 22.00c per lb of Si. Packed, c.l. 23.65c, ton lot 24.95c, less ton 25.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c, for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contact, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.
35-40% Zirconium Alloy: Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, of 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALICIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅜ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, carload packed in box pallets 19.80c, in bags 20.70c; 3000 lb to c.l. in box pallets 21.00c; 2000 lb to c.l. in bags, 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l., bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l., bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c; (Small size—weighing approx 2½ lb and containing 1 lb of Si.) Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l., pallets 9.65c; 2000 lb to c.l., bags, 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Ton lots 2" x D, $4.25 per lb of contained Cb; less ton lots, $4.30. Delivered.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $3.70 per lb of contained Cb plus Ta, delivered; less ton lot $3.75.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5.7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unistage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo., in 200-lb container, f.o.b. Langeloth and Washington, Pa. $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo. in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

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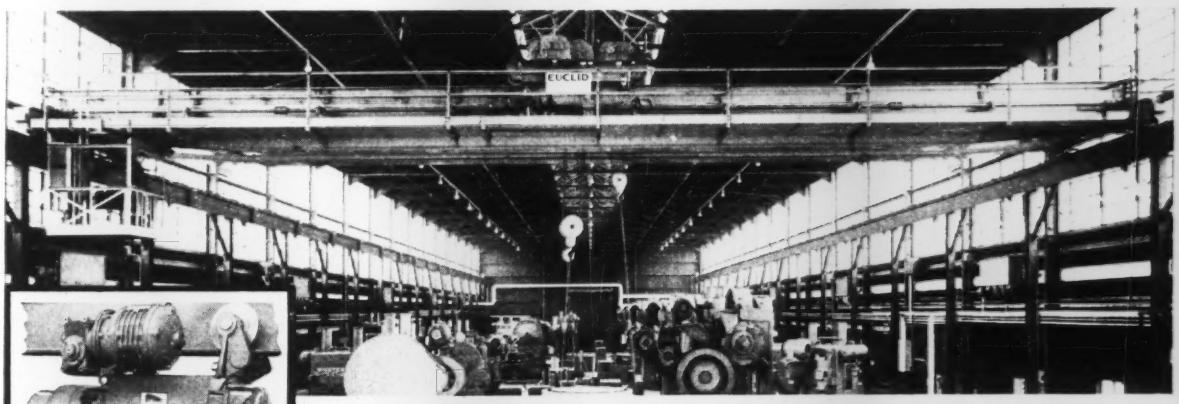

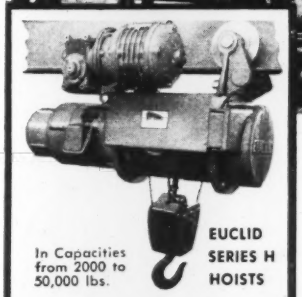

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The planetary gearing and mechanical load brake are mounted in oil tight housings. The hoist gearing is assembled in the hoist drum.

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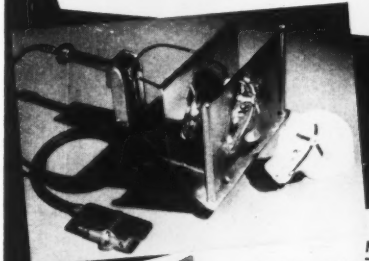

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Scrap Price Index Still Slipping

STEEL's composite on the prime grade declines another 17 cents, now standing at $34.33. Slow demand and sluggish steelmaking operations are reflected

Scrap Prices, Page 158

Philadelphia—Except for No. 2 bundled scrap, prices are unchanged in a generally dull and heavy market. No. 2 bundles are off $1 a ton to $27, delivered. No. 1 heavy melting continues to hold at $38.50.

Chicago—Scrap prices held steady last week, following the sharp drop of the previous week, but the market is listless. The only development of note: A large district steelmaker announced its price for No. 1 heavy melting steel of industrial origin will be $33 a gross ton for April delivery. That's $1 higher than another large mill has been offering and paying.

New York—The local market is easy, but prices are unchanged except for low phos structurals and plates which are nominally $35-$36 and No. 2 bundles, $25-$26.

Pittsburgh—A mill on the fringe of the Pittsburgh district made a small purchase of No. 1 heavy melting at $34 last week. Prices dropped $1 to $6 in a general weakening of the market.

Cleveland — With district steelmaking operations bouncing around the 32 per cent of capacity mark, steelmakers are not showing much interest in scrap offerings. The market continues weak, and prices are nominal in the absence of representative sales.

Youngstown—The local market is still pointing downward. Mill and dealer yards are heavily stocked. Some consumers have indicated that if they buy this month it will be at lower prices than those now quoted. The district ingot rate is estimated at 45 per cent. No. 1 heavy melting is quoted at $35.

Cincinnati—Prices on the principal steelmaking grades moved down $2 to $3 a ton last week as area mills entered the market for their April requirements. Dealers' hesitancy in accepting low prices is fading.

Detroit — Scrap prices tumbled again. A lack of buyers caused dealers to be cautious in bidding on the auto lists. The slide in the market has finally affected the foundry grades which are quoted lower on the basis of a few scattered purchases of heavy breakable cast scrap.

Buffalo — Scrap price lists this month are expected to see a continuation of the sidewise movement. There is little prospect that quotations will advance soon, but market observers do not expect they will decline because of limited supplies in dealers' yards.

Houston — Prices on premium grades of scrap are off $3 to $5 a ton on the basis of a small purchase

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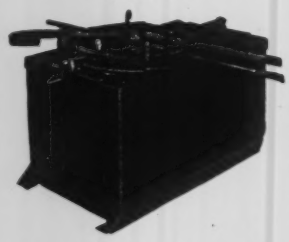
For Concrete Reinforcing Bars

Model D-2



The Model D-2 Kardong Bender is a Four Direction Horizontal Bender. With this bender it is not necessary to turn bars over to make reverse or second bends on beam bars. The Model D-2 is made in two sizes, Model D-2 Standard 6-inch, which will bend bars around collars 2-inch to 6-inch, and Model D-2 Special 8-inch, which will bend bars around collars 2-inch to 8-inch. Capacity of both models, 1¼-inch Square Bars. The Model D-2 is a production bender for reinforcing steel fabricating shop. Ask for catalog of our complete line of reinforcing bar benders.

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MACHINERY BUILDERS
ESTABLISHED 1936

for April delivery by the leading Texas steel mill. On the basis of its current operating rate, this steelmaker has more than a six month supply of scrap. It bought less than half its requirements for this month.

Except for sporadic buying at Eagle Pass, Tex., for a Mexican mill, no other support for the southwest market is expected this month. A second Texas steel mill may not buy during this quarter.

Birmingham — Prices are unchanged. But buying by domestic consumers is lacking, and quotations are untested, except for a dribble of orders for cast iron material. Open-hearth consumers and electric furnace operators are out of the market.

Seattle — Market conditions are unchanged here. Some dealers note a slightly easier situation, but sales on which to base firm prices are lacking. Yard receipts are lagging, and the larger buyers hold comfortable inventories.

Occasional lots are being sold for export, but indications are there will be little buying on Japanese account for several months.

The City of Seattle took bids Apr. 3 on about 100 tons of scrap rails.

Los Angeles—The local scrap market continues in the doldrums. No signs of an early improvement are seen. Mills are operating at a low rate, and they are buying little scrap. Prices are soft, but posted figures are unchanged. They are of little significance in the absence of representative purchases.

Structural Shapes . . .

Structural Shape Prices, Page 146

Public construction and highway work figure prominently in the structural market. The opening up of spring building programs is accounting for a little pickup, but demand is sluggish, and competition for new work is keen among fabricators as their backlogs shrink.

More bridge tonnage is being estimated. In New England, 10,000 tons, largely Connecticut projects, are involved. Contracts include 2000 tons for an office building addition in Boston.

New York and eastern Pennsylvania fabricators are taking more contracts in the northeast. Lower cost is placing most northern New England tonnage with the South Portland, Maine, shop.

Missile launching platforms and assembly buildings account for heavier inquiry at Nike sites. Watertown Arsenal will fabricate a substantial tonnage. It has a $900,000 contract for launching structures.

Highway work to be let in Indiana this month amounts to 55 per cent of 1957 total volume. Illinois also has plans for increasing its highway program. The projects won't be speedily translated into steel inquiry because engineering work will take considerable time.

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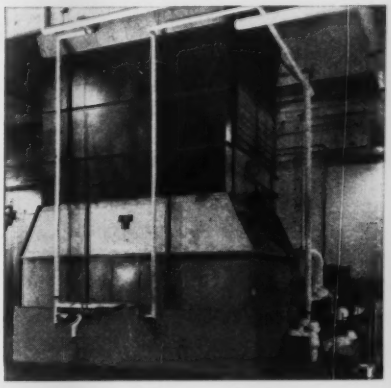

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Apr. 2, 1958. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Apr. 2	$34.33
Mar. 26	34.50
Mar. Avg.	36.20
Apr. 1957	43.57
Apr. 1953	42.88

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	*29.00-30.00*
No. 1 dealer bundles	*33.00-34.00*
No. 2 bundles	26.00-27.00
No. 1 busheling	*33.00-34.00*
No. 1 factory bundles	*36.00-37.00*
Machine shop turnings	*16.00-17.00*
Mixed borings, turnings	*16.00-17.00*
Short shovel turnings	*19.00-20.00*
Cast iron borings	*16.00-17.00*
Cut structurals:	
2 ft and under	*39.00-40.00*
3 ft lengths	*38.00-39.00*
Heavy turnings	*28.00-29.00*
Punchings & plate scrap	*38.00-39.00*
Electric furnace bundles	*38.00-39.00*

Cast Iron Grades

No. 1 cupola	40.00-41.00
Stove plate	40.00-41.00
Unstripped motor blocks	26.00-27.00
Clean auto cast	*40.00-41.00*
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	*38.00-39.00*
Rails, 2 ft and under	*54.00-55.00*
Rails, 18 in. and under	*54.00-55.00*
Angles, splice bars	*48.00-49.00*
Rails, rerolling	*58.00-59.00*

Stainless Steel Scrap

18-8 bundles & solids	*175.00-180.00*
18-8 turnings	*80.00-85.00*
430 bundles & solids	*110.00-115.00*
430 turnings	*50.00-52.00*

CHICAGO

No. 1 heavy melt., indus.	*31.00-33.00*
No. 1 hvy melt., dealer	29.00-30.00
No. 2 heavy melting	27.00-28.00
No. 1 factory bundles	34.00-35.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	22.00-23.00
No. 1 busheling, indus.	*31.00-33.00*
No. 1 busheling, dealer	29.00-30.00
Machine shop turnings	17.00-18.00
Mixed borings, turnings	19.00-20.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut structurals, 3 ft	41.00-42.00
Punchings & plate scrap	42.00-43.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Stove plate	38.00-39.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	48.00-49.00
Drop broken machinery	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
R. R. malleable	53.00-54.00
Rails, 2 ft and under	54.00-55.00
Rails, 18 in. and under	55.00-56.00
Angles, splice bars	51.00-52.00
Axles	56.00-57.00
Rails, rerolling	54.00-55.00

Stainless Steel Scrap

18-8 bundles & solids	*165.00-170.00*
18-8 turnings	85.00-95.00
430 bundles & solids	90.00-100.00
430 turnings	47.50-52.50

YOUNGSTOWN

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	*23.00-24.00*
No. 1 busheling	*33.00-34.00*
No. 1 bundles	*33.00-34.00*
No. 2 bundles	*23.00-24.00*
Machine shop turnings	10.00-11.00
Short shovel turnings	14.00-15.00
Cast iron borings	14.00-15.00
Low phos.	36.00-37.00
Electric furnace bundles	*34.00-35.00*

Railroad Scrap

No. 1 R. R. heavy melt.	40.00-41.00

CLEVELAND

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	*20.00-21.00*
No. 1 factory bundles	*32.00-33.00*
No. 1 bundles	*30.00-31.00*
No. 2 bundles	*21.00-22.00*
No. 1 busheling	*30.00-31.00*
Machine ship turnings	8.00-9.00
Short shovel turnings	12.00-13.00
Mixed borings, turnings	12.00-13.00
Cast iron borings	12.00-13.00
Cut foundry steel	36.00-37.00
Cut structurals, plates 2 ft and under	*39.00-40.00*
Low phos, punchings & plate	*31.00-32.00*
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	*31.00-32.00*

Cast Iron Grades

No. 1 cupola	43.00-44.00
Charging box cast	34.00-35.00
Heavy breakable cast	34.00-35.00
Stove plate	43.00-44.00
Unstripped motor blocks	26.00-27.00
Brake shoes	34.00-35.00
Clean auto cast	43.00-44.00
Burnt cast	31.00-32.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	60.00-61.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Rails, random lengths	50.00-51.00
Cast steel	47.00-48.00
Railroad specialties	49.00-50.00
Uncut tires	41.00-42.00
Angles, splice bars	49.00-50.00
Rails, rerolling	56.00-57.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	90.00-95.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	33.00
No. 2 heavy melting	30.00
No. 1 bundles	33.00
No. 2 bundles	25.00
No. 1 busheling	33.00
Machine shop turnings	18.00
Short shovel turnings	20.00

Cast Iron Grades

No. 1 cupola	45.00
Charging box cast	33.00
Heavy breakable cast	33.00
Unstripped motor blocks	33.00
Clean auto cast	45.00
Stove plate	40.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00
Rails, 18 in. and under	56.00
Rails, random lengths	50.00
Rails, rerolling	56.00
Angles, splice bars	49.00

BIRMINGHAM

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	33.00-34.00
No. 2 bundles	21.00-22.00
No. 1 busheling	33.00-34.00
Cast iron borings	12.00-13.00
Machine shop turnings	24.00-25.00
Short shovel turnings	25.00-26.00
Bar crops and plates	39.00-40.00
Structurals & plates	38.00-39.00
Electric furnace bundles	37.00-38.00
Electric furnace:	
2 ft and under	37.00-38.00
3 ft and under	36.00-37.00

Cast Iron Grades

No. 1 cupola	51.00-52.00
Stove plate	49.00-50.00
Unstripped motor blocks	40.00-41.00
Charging box cast	22.00-23.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 18 in. and under	49.00-50.00
Rails, rerolling	52.00-53.00
Rails, random lengths	45.00-46.00
Angles, splice bars	43.00-44.00

PHILADELPHIA

No. 1 heavy melting	38.50
No. 2 heavy melting	35.00
No. 1 bundles	38.50
No. 2 bundles	*$27.00*
No. 1 busheling	38.50
Electric furnace bundles	40.00
Mixed borings, turnings	18.50†
Short shovel turnings	21.00†
Machine shop turnings	18.50†
Heavy turnings	34.00†
Structurals & plate	43.00-44.00
Couplers, springs, wheels	46.00
Rail crops, 2 ft. & under	59.00-60.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	44.00
Malleable	62.00
Drop broken machinery	50.00

†Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	33.00-34.00
No. 2 bundles	*25.00-26.00†*
Machine shop turnings	11.00-12.00†
Mixed borings, turnings	12.00-13.00†
Short shovel turnings	14.00-15.00†
Low phos. (structurals & plates	*35.00-36.00†*

Cast Iron Grades

No. 1 cupola	35.00-36.00
Unstripped motor blocks	28.00-29.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	60.00-65.00
410 sheets, clips, solids	60.00-65.00
430 sheets, clips, solids	75.00-80.00

†Nominal.

BUFFALO

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 2 bundles	23.00-24.00
No. 1 busheling	28.00-29.00
Mixed borings, turnings	14.00-15.00
Machine shop turnings	12.00-13.00
Short shovel turnings	15.00-16.00
Cast iron borings	14.00-15.00
Low phos. structurals and plate, 5 ft and under	33.00-34.00
2 ft and under	37.00-38.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	43.00-44.00
No. 1 machinery	48.00-49.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 3 ft and under	53.00-54.00
Railroad specialties	37.00-38.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*29.50-30.50*
No. 2 heavy melting	*26.50-27.50*
No. 1 bundles	*29.50-30.50*
No. 2 bundles	*19.00-20.00*
No. 1 busheling	*29.50-30.00*
Machine shop turnings	*12.00-13.00*
Mixed borings, turnings	*11.00-12.00*
Short shovel turnings	*16.00-17.00*
Cast iron borings	*11.00-12.00*
Low phos. 18 in.	*36.00-37.00*

Cast Iron Grades

No. 1 cupola	*38.00-39.00*
Heavy breakable cast	*32.00-33.00*
Charging box cast	*32.00-33.00*
Drop broken machinery	*46.00-47.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*34.00-35.00*
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	44.00-45.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	*32.00*
No. 2 heavy melting	*30.00*
No. 2 bundles	*22.00**
Crushed turnings	*19.00*
Machine shop turnings	*15.00-16.00*
Low phos. plates, structurals	*37.00*

Cast Iron Grades

No. 1 cupola	*38.00-39.00*
Heavy breakable	30.00-31.00*
Unstripped motor blocks	30.00-32.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*34.00*

*Nominal

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	30.00
No. 2 heavy melting	22.00
No. 1 bundles	29.00
No. 2 bundles	*16.00*
No. 1 busheling	29.00
Machine shop turnings	9.50-10.00†
Mixed borings, turnings	9.50-10.00
Short shovel turnings	11.00-11.50†
No. 1 cast	29.00-30.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	35.00-36.00

†Nominal

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*25.00-26.00*
No. 2 heavy melting	*19.00-20.00*
No. 1 bundles	*26.00-27.00*
No. 2 bundles	*14.00-15.00*
No. 1 busheling	*25.00-26.00*
Machine shop turnings	*6.00-7.00*
Mixed borings, turnings	*7.00-8.00*
Short shovel turnings	*8.00-9.00*
Punchings & plate	29.00-30.00

Cast Iron Grades

No. 1 cupola	*29.00-30.00*
Stove plate	*24.00-25.00*
Charging box cast	*22.00-23.00*
Heavy breakable	*24.00-25.00*
Unstripped motor blocks	*14.00-15.00*
Clean auto cast	*31.00-32.00*

SEATTLE

No. 1 heavy melting	30.00
No. 2 heavy melting	28.00
No. 1 bundles	24.00
No. 2 bundles	23.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Electric furnace No. 1	38.00

Cast Iron Grades

No. 1 cupola	31.00
Heavy breakable cast	28.00
Unstripped motor blocks	23.00
Stove plate (f.o.b. plant)	21.00

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	28.00
No. 2 bundles	20.00
Machine shop turnings	9.00
Shoveling turnings	11.00
Cast iron borings	10.00
Cut structurals and plate 1 ft and under	43.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	38.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	22.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Cast iron borings	15.00
Heavy turnings	15.00
Short shovel turnings	15.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

No. 1 heavy melting	32.00
No. 2 heavy melting	28.00
No. 1 bundles	32.00
No. 2 bundles	25.00
Mixed steel scrap	27.00
Mixed borings, turnings	17.00
Busheling, new factory:	
Prepared	32.00
Unprepared	26.00
Short steel turnings	21.00

Cast Iron Grades†

No. 1 machinery cast	45.00-50.00

†F.o.b. Hamilton, Ont.

A trainee taught us some ABC's

At a briefing of trainees one of the boys asked: "Can I buy U. S. Savings Bonds through the Company and have my deductions made automatically?" Frankly we had assumed that all of our employees knew all about the Payroll Savings Plan.

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STEEL
The Metalworking Weekly

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Aluminum Price Cut to 24¢

First reduction in 16 years is precipitated by drop in Canadian quotation. Demand expected to remain as is. Lead producers chop their price 1 cent

Nonferrous Metal Prices, Pages 162 & 163

ALUMINUM, the glamour metal of the nonferrous family, has found it's not immune to the price fluctuations that have plagued its older cousins.

In a move that stunned the nonferrous industry, on Apr. 1 primary producers dropped the price of pig 2 cents—to 24 cents a pound. It marks the first time in 16 years the pig quotation has been cut.

Timetable—The first salvo was fired on Mar. 27 when Aluminium Ltd.'s prexy, Nathanael V. Davis, announced that effective Apr. 1 his company was trimming the price of pig 2 cents a pound on a world-wide basis. (Last year, Aluminium shipped 227,800 tons of pig to the U. S., its biggest customer. See chart.)

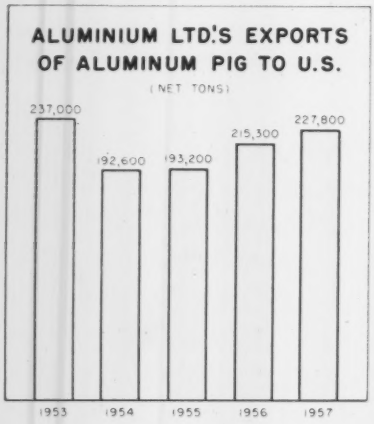
The next day, Aluminum Co. of America revealed it would follow suit to meet competition. Within hours, Reynolds Metals Co. and Kaiser Aluminum & Chemical Corp. made similar announcements. They were later joined by Anaconda Co.

Why?—In explaining his move, Mr. Davis said: "Aluminum is now in free supply, and new capacity is scheduled to come into production in many areas. It is our conviction that this action will make aluminum more competitive with other materials, encouraging engineers and manufacturers to design their products for more of it and thus open up new applications for our product."

In nonferrous circles, it's believed that an important factor behind Aluminium's decision was the desire to meet Russian competition in the United Kingdom. Reliable sources say Russia sold 50,000 tons of pig in the UK last year at the expense of Aluminium.

Help?—One American producer says the new price will make aluminum more competitive with copper in the electrical conductor market and in such auto applications as battery cables, housings, and fittings. (Primary copper now sells for 25 cents a pound.) The same producer says aluminum could also get a larger share of the diecasting market from zinc.

But most aluminum people seem to be anything but happy. One spokesman points up this hypothetical case based on the new price, vs. the old: "If a company sold 500,000 tons of pig during the rest of 1958 at the 24-cent figure, it would lose $20 million in sales revenue. The company would have to sell an additional 42,000 tons of pig to take in what it would at the 26-cent level. In today's market, this would call for a real sales job." Consensus: It's doubtful the lower price will stimulate demand enough to make up for the loss in revenue.



More Costs — Besides being troubled by inflation, U. S. producers are faced with a labor contract that calls for a healthy wage boost on Aug. 1. Major terms: A 14 cent an hour raise per worker, plus cost of living adjustments.

Mill product quotations are being adjusted this week to correspond with the lower pig price.

Lead Price Gets the Ax

Oversupply left its mark on the lead industry last week as producers dropped their price from 13 to 12 cents a pound, New York (Apr. 1). This is the lowest quotation for lead since 1945. At 12 cents, producers feel they may beat foreign competition in the Midwest, but it will have little effect on the eastern seaboard.

Immediately following that announcement, one spokesman said he did not feel that the zinc price was in immediate jeopardy. "We're on the floor now. Any further reduction would probably be only a move to improve the chances of getting better tariff treatment."

Zinc Stockpiling Halts

The Office of Defense Mobilization says that deliveries of zinc to the national stockpile will end Apr. 15. However, lead will still be called for, probably until June. The zinc goal has been reached, according to Gordon Gray, ODM director.

NONFERROUS PRICE RECORD

	Price Apr. 2	Last Change	Previous Price	Mar. Avg	Feb. Avg	Apr., 1957 Avg
Aluminum	24.00	Apr. 1, 1958	26.00	26.000	26.000	25.000
Copper	24.00-25.00	Mar. 24, 1958	23.30-25.00	24.163	24.298	31.598
Lead	11.80	Apr. 1, 1958	12.80	12.800	12.800	15.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	92.375	Apr. 2, 1958	92.50	93.425	93.818	99.276
Zinc	10.00	July 1, 1957	10.50	10.000	10.000	13.500

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.

BRIDGEPORT BRASS
COPPER ALLOY BULLETIN

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Cored Forgings for Better, More Intricate Parts at Lower Costs

Compared with casting or solid forging, Bridgeport cored forgings save up to 50% in materials . . . cut machining and finishing time...reduce tool costs...eliminate rejects.

Cored forgings can be held to fine tolerances with accuracies of 0.005". They have great strength, high density, uniform grain structure, no porosity, and an extremely fine-textured hardware finish. High strength parts can be forged closer to finished forms than by other methods.

Send a sample part or assembly, together with full specifications, to the National Cored Forgings Division of Bridgeport Brass. Cost estimates will be supplied.

Typical cored-forged parts

Metal Laminates Solve Design, Production Problems

Bridgeport Metal Laminates provide combinations of chemical, physical and mechanical properties unobtainable in a single metal. Use them to solve dual corrosion problems, improve electrical and thermal conductivity, combine high thermal conductivity with corrosion resistance, and provide greater strength-to-weight ratios.

Write for test samples and for a copy of the 8-page booklet detailing applications, properties, types, sizes, etc., of Bridgeport Metal Laminates.

Stock Temper Bridgeport Wire Meets Many Special Cold Heading Needs

A few of the wide range of Rockford Screw Products fasteners made with Bridgeport wire.

Bridgeport's high-quality standard alloys help produce superior products and cut costs too. For example, Rockford Screw Products, Rockford, Ill., finds it possible to use our *stock temper* wire for a wide range of special and standard fasteners. Gains in economy are obvious. To conserve material and reduce manufacturing costs, the company cold heads the parts. Bridgeport Brass and Copper Alloy wires have the high qualities of malleability, ductility, strength and stiffness for this process.

Alloys Used

Three Bridgeport Alloys are used by Rockford Screw Products:

70-30 Brass 69: an extremely ductile wire, particularly suitable for making exceptionally large heads and certain types of hollow rivets.

Silicon Bronze 609: an outstandingly malleable alloy even in hard-drawn condition. Finished bolts above 100,000 lb per square inch can be produced from it. This alloy is highly resistant to stress-corrosion cracking and is suitable for outdoor construction where brass and steel may not be satisfactory.

Commercial Bronze 25: although named "commercial bronze," this alloy does not contain tin. It resists season-cracking and is more resistant to dezincification than brass. It is recommended for interior or exterior applications.

Bridgeport's Wide Range of Alloys

Rockford Screw Products has found that corrosion resistance, lasting strength and hardness, and ease of finishing make Bridgeport Brass and Copper Alloys ideal for all types of industrial fasteners. And the great variety of alloys available assures the selection of a metal with exactly the right characteristics for any particular job.

Whatever the application and whatever the industry, Bridgeport Alloys help improve products, smooth production, cut costs. Your Bridgeport Salesman will be happy to advise you—and through him is available the full experience and facilities of Bridgeport's Technical Service. Call him.

BRIDGEPORT BRASS

Bridgeport Brass Company, Bridgeport 2, Conn. • Sales Offices in Principal Cities
In Canada: Noranda Copper and Brass Limited, Montreal

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.00; ingots, 26.10, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 31.30; No. 241, 31.50; No. 356, 29.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 23.50-24.50. New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per ton, ton lots.

Cadmium: Sticks and bars, $1.55 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $55-90 per lb, nom.

Copper: Electrolyic, 25.00 deld.; custom smelters, 24.00; lake, 25.00 deld.; fire refined, 24.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-90 nom. per troy oz.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. thick, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $232-237 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 779.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty, New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $70-100 per troy oz nom.

Palladium: $19-21 per troy oz.

Platinum: $68-75 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 88.625 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 92.375.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.15 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00. 99 + % hydrogen reduced, $3.85.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Diecasting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.00-24.00; No. 12 foundry alloy (No. 2 grade), 21.00-21.50; 5% silicon alloy, 0.60 Cu max., 24.25-25.00; 13 alloy, 0.60 Cu max., 24.25-25.00; 195 alloy, 24.00-25.50; 108 alloy, 21.50-21.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.00; grade 2, 21.25; grade 3, 20.00; grade 4, 18.00.

Brass Ingot: Red brass, No. 115, 25.25; tin bronze, No. 225 34.00, No. 245, 28.75; high-leaded tin bronze, No. 305, 29.25, No. 1 yellow, No. 405, 20.75; manganese bronze, No. 421, 23.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.80, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.78, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 30.355; l.c.l., 30.98. Weatherproof, 30,000-lb lots, 32.53; l.c.l., 33.28. Magnet wire deld., 38.43, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, $24.00; plate, $12.50-19.20; H.R. strip, $12.50-22.90; $11.00-17.40.

ZIRCONIUM

C.R. strip, $15.00-31.25; forged or H.R. bars, ribbon zinc in coils, 20.50; plates, 19.00.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strips, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	.....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.017	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.009	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.70	47.50
5050-F	43.80	48.60
3004-F	44.80	50.50
5052-F	44.40	51.20
6061-T6	46.90	53.00
2024-T4	50.60	57.40
7075-T6*	58.40	66.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round— 2011-T3	Round— 2017-T4	Hexagonal— 2011-T3	Hexagonal— 2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.40	....	....
0.188	66.20	63.40	....	81.60
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.547	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, random lengths: 2014-F, 46.90-53.90, diam. 1-8 in.; 6061-F, 43.50-53.90, diam. 1-6 in.; 7075-F, 63.50-73.90, diam. 1-3.875 in.; 7079-F, 68.50-78.90, diam. 1-3.875 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
18-20	46.50-48.30	64.50-70.10

width: .125 in., 74.90; .188 in., 71.70-72.70;

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10;".081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, .25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.00-13.50; old sheets, 10.00-10.50; borings and turnings, 6.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.13b	45.36c	....	48.32	21.000	21.000	20.250
Yellow Brass	42.69	31.03d	43.23	45.60	16.125	15.875	14.500
Low Brass, 80%	44.90	44.84	45.44	47.71	17.875	17.625	17.125
Red Brass, 85%	45.67	45.61	46.21	48.48	18.625	18.375	17.875
Com. Bronze, 90%	46.98	46.92	47.52	49.54	19.250	19.000	18.500
Manganese Bronze	50.81	44.91	55.44	....	14.875	14.625	14.125
Muntz Metal	45.19	41.00	....	....	15.125	14.875	14.375
Naval Brass	47.07	41.38	54.13	50.48	14.875	14.625	14.125
Silicon Bronze	52.84	52.03	52.88	54.77	20.625	20.375	19.625
Nickel Silver, 10%	57.93	60.26	60.26	....	21.125	20.875	10.562
Phos. Bronze, A-5%	67.17	67.67	67.67	68.85	21.875	21.625	20.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, or any or all kinds of scrap, add 1 cent per lb.

7.00; crankcase, 10.00-10.50; industrial castings, 10.00-10.50.

Copper and Brass: No. 1 heavy copper and wire, 17.50-18.00; No. 2 heavy copper and wire, 15.50-16.00; light copper, 13.50-14.00; No. 1 composition red brass, 14.50-15.00; No. 1 composition turnings, 13.50-14.00; new brass clippings, 13.00-13.50; light brass, 8.00-8.50; heavy yellow brass, 10.00-10.50; new brass rod ends, 11.00-11.50; auto radiators, unsweated, 11.00-11.50; cocks and faucets, 12.00-12.50; brass pipe, 12.00-12.50.

Lead: Heavy, 8.50-9.00; battery plates, 3.50-3.75; linotype and stereotype, 9.75-10.25; electrotype, 9.00-9.50; mixed babbitt, 10.50-11.00.

Monel: Clippings, 28.00-29.00; old sheets, 25.00-26.00; turnings, 20.00-23.00; rods, 28.00-29.00.

Nickel: Sheets and clips, 42.00-45.00; rolled anodes, 42.00-45.00; turnings, 37.00-40.00; rod ends, 42.00-45.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 15.50-16.25; 3003 clippings, 15.50-16.25; 6151 clippings, 15.50-16.50; 5052 clippings, 15.00-15.75; 2014 clippings, 15.00-15.25; 2017 clippings, 15.00-15.25; 2024 clippings, 15.00-15.25; mixed clippings, 14.00-14.75; old sheets, 11.50-12.25; old cast, 11.50-12.25; clean old cable (free of steel), 14.50-15.25; borings and turnings, 12.00-13.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 51.00; light scrap, 46.00; turnings and borings, 31.00.

Copper and Brass: No. 1 heavy copper and wire, 20.00; No. 2 heavy copper and wire 18.25; light copper, 16.00; refinery brass (60% copper) per dry copper content, 17.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 20.00; No. 2 heavy copper and wire, 18.25; light copper, 16.00; No. 1 composition borings, 17.25; No. 1 composition solids, 17.25; heavy yellow brass solids, 11.50; yellow brass turnings, 10.50; radiators, 14.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quanties)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 41.79; oval, 40.00, 5000-10,000 lb; electrodeposited, 31.25, 2000-5000 lb lots; cast, 36.25, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 111.50; 200-499 lb, 110.00; 500-999 lb, 109.50; 1000 lb or more, 109.00.

Zinc: Balls, 16.00; flat tops, 16.00; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.
Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30; f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 68.40; 300-900 lb, 66.40; 1000-19,900 lb, 64.40.

Copper Sulphate: 100-1900 lb, 13.70; 2000-5900 lb, 11.70; 6000-11,900 lb, 11.45; 12,000-22,900 lb, 11.20; 23,000 lb or more, 10.70.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400-999 lb, 43.50; 10,000 lb or more, 40.50.

Nickel Sulphate: 5000-22,000 lb, 33.50; 23,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.60; 200 lb, 25.90; 400 lb, 22.90; 1000 lb, 21.90; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 74.70; 100-600 lb, 65.80; 700-1900 lb, 63.00; 2000-9900 lb, 61.20; 10,000 lb or more, 59.80.

Stannous Chloride (anhydrous): Less than 25 lb, 164.10; 25 lb, 129.10; 100 lb, 114.10; 400 lb, 111.60; 5200-19,600 lb, 99.40; 20,000 lb or more, 87.20.

Stannous Sulphate: Less than 50 lb, 126.90; 50 lb, 96.90; 100-1900 lb, 94.90; 2000 lb or more, 92.90.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1100 tons, general service building, Georgia Power Co., Atlanta, to the Calvert Iron Works Inc., Atlanta; Beers Construction Co., Atlanta, general contractor; 70 tons, reinforcing bars, to the Calvert Iron Works Inc.

1600 tons, operations building, Baptist Sunday School Board, Nashville, Tenn., to the Ingalls Iron Works, Norristown, Pa.; W. F. Holt & Sons, Nashville, general contractor.

1440 tons, five state highway bridge structures, Saratoga County, New York, to the City Iron Works, Hartford, Conn.; Arute Bros. Inc., New Britain, Conn., general contractor.

450 tons, terminal building, state airport, Hillsgrove, R. I., to the Tower Iron Works, Providence, R. I.; Nanni Building Co., Johnston, R. I., general contractor; 75 tons, reinforcing bars, Plantations Steel Co., Providence.

350 tons, I-beam and concrete box girder bridge, Bangor, Maine, to the Bancroft & Martin Rolling Mills Co., South Portland, Maine; Westcott Construction Co., North Attleboro, Mass., general contractor.

345 tons, two I-beam bridges, Cumberland, Maine, to the Bancroft & Martin Rolling Mills Co., South Portland, Maine; H. E. Callahan Inc., Auburn, Maine, is general contractor.

300 tons, newspaper publishing plant, *Herald-Traveler*, Boston, to the Grand Iron Works, New York; B. Perini & Sons Inc., Framingham, Mass., general contractor; 1500 tons reinforcing bars, to the U. S. Steel Supply Div., U. S. Steel Corp., Boston.

150 tons, Blue Cross headquarters, Seattle, to the Pacific Car & Foundry Co., Seattle; John H. Sellen Construction Co., Seattle, general contractor.

STRUCTURAL STEEL PENDING

1000 tons, 531-ft interstate highway bridge, Vancouver, Wash.; General Construction Co., Portland, Oreg., low at $2,993,995 to the Oregon Highway Commission.

900 tons, also piling, Oregon State bridge, Snake River; bids in at Portland, Oreg.

800 tons, Washington State highway bridges, Pierce, Chelan, and Adams counties; bids in Apr. 1.

500 tons, trashracks and equipment, Chandler project, Washington State; bids in to the Bureau of Reclamation, Denver.

117 tons, metal crossarms; bids in to the Bonneville Power Administration, Portland, Oreg.

(Please turn to Page 164)

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Help Wanted

GENERAL FOUNDRY FOREMAN
For mechanized ferrous foundry in Midwest. Must be experienced in gating. Have knowledge of Standard Costs. Supervise all molding operations. Submit confidential resume. Write Box 646, STEEL, Penton Bldg., Cleveland 13, Ohio.

EXPERIENCED MISCELLANEOUS AND ORNAMENTAL iron estimator or detailer to take complete charge of drafting department, including all purchasing and expediting. Please give complete resume of experience, age, and salary expected in first reply. Write Box 648, STEEL, Penton Bldg., Cleveland 13, Ohio.

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To ease your needs for . . .

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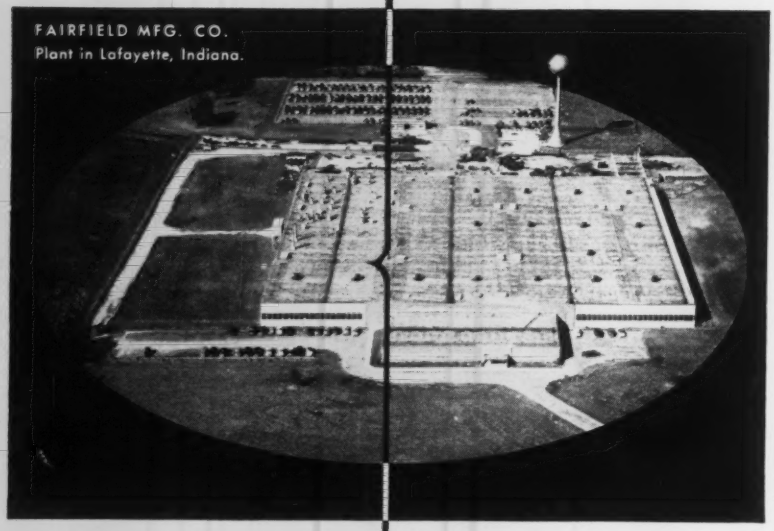

This Ultra-Modern, High Precision **GEAR MAKING** Facility . . . . . **AVAILABLE TO YOU**

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TRACTORS • HEAVY DUTY TRUCKS • AGRICULTURAL MACHINERY • POWER SHOVELS AND CRANES
MINING MACHINES • ROAD GRADERS • BUSES • STREET SWEEPERS • INDUSTRIAL LIFT TRUCKS

(*Concluded from Page 163*)

REINFORCING BARS . . .

REINFORCING BARS PLACED

2400 tons, operations building, Baptist Sunday School Board, Nashville, Tenn., to Wilson, Weesner & Williams Co.; W. F. Holt & Sons, Nashville, is general contractor.

2000 tons, 21-story office building and attached eight-story garage, Superior Ave., Ninth & Walnut Streets, Cleveland, Tishman Realty & Construction Co. Inc., to the Builders Structural Steel Corp., Cleveland.

785 tons, I-beam and concrete box girder bridge, Bangor, Maine, to the Bancroft & Martin Rolling Mills Co., South Portland, Maine; Westcott Construction Co., North Attleboro, Mass., general contractor; also 60 tons, H-beam pilings, Bethlehem Steel Co., Bethlehem, Pa.

600 tons, University Center Building, Tulane University, New Orleans, to the Laclede Steel Co., St. Louis; Farnsworth & Chambers Co., New Orleans, general contractor; 40 tons, structurals, Delany Steel Co., New Orleans.

410 tons, five state highway bridge structures, Saratoga County, New York, to the Bethlehem Steel Co., Bethlehem, Pa.; Arute Bros. Inc., New Britain, Conn., is general contractor.

400 tons, University of Washington, engineering building, Seattle, to the Northwest Steel Rolling Mills Inc., Seattle; John H. Sellen Construction Co., Seattle, general contractor at $932,075.

250 tons, state highway bridges, Tift-Turner counties, Georgia, to Joe Brashews Steel Inc., Albany, Ga.; H. M. Pafford Jr., Waycross, Ga., general contractor.

200 tons, four grade separation structures, Tift county, Georgia, to the Alabama Steel Co., Birmingham; W. L. Robinson Construction Co., College Park, Pa.; fabricated structural steel, American Bridge Div., U. S. Steel Corp., Pittsburgh.

180 tons, two I-beam bridges, Cumberland-Yarmouth, Maine, to the Bancroft & Martin Rolling Mills Co., South Portland, Maine; H. E. Callahan Inc., Auburn, Maine, general contractor; 100 tons of H-beam piling, Bethlehem Steel Co., Bethlehem, Pa.

53 tons, Blue Cross headquarters, Seattle, to the Bethlehem Pacific Coast Steel Corp., Seattle; John H. Sellen Construction Co., Seattle, general contractor.

REINFORCING BARS PENDING

37,750 tons, work section No. 1 Niagara Falls, N. Y., Niagara contract N-5, St. Lawrence Seaway; bids May 6, Power Authority of the State of New York, New York.

34,250 tons, work section No. 2, Niagara contract No. N-6, St. Lawrence Seaway; bids May 1, Power Authority of the State of New York, New York.

22,500 tons, work section No. 3, Lewiston-Niagara, N. Y., Niagara contract N-7, St. Lawrence Seaway; bids May 20, Power Authority of the State of New York, New York.

720 tons, reinforced concrete highway, including 645 tons of welded mesh, Warwick-West Greenwich, R. I.

615 tons, railroad bridge and three grade separation structures, relocation, Route 34, New Haven, Conn.; bids Apr. 10, Hartford, Conn.; also 300 tons of H-piles.

415 tons, rebuilding interstate bridge, Vancouver, Wash.; General Construction Co., Portland, Oreg., low base bid of $2,993,995 to the Oregon Highway Commission.

400 tons, Washington State highway projects, Lincoln, Adams, Whatcom and Klickitat counties; bids in.

400 tons, Oregon highway projects, bids in.

300 tons, interstate bridge, Snake River; bids in to the Oregon Highway Commission.

250 tons, Bank of California, open deck parking garage, Seattle; general contract to the General Construction Co., Seattle.

150 tons, ammunition magazines, Geiger Air Base, Washington State; H. Halvorson Inc., Yardley, Wash., low bidder at $691,924.

100 tons, Washington State, highway project, Grays Harbor County; bids to Olympia, Wash., Apr. 15.

100 tons plus, two 245-ft underpasses and two overpasses, Power County, Idaho; bids to Boise, Idaho, Apr. 15.

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NORTHERN CRANES

. . . . . for cutting cost corners

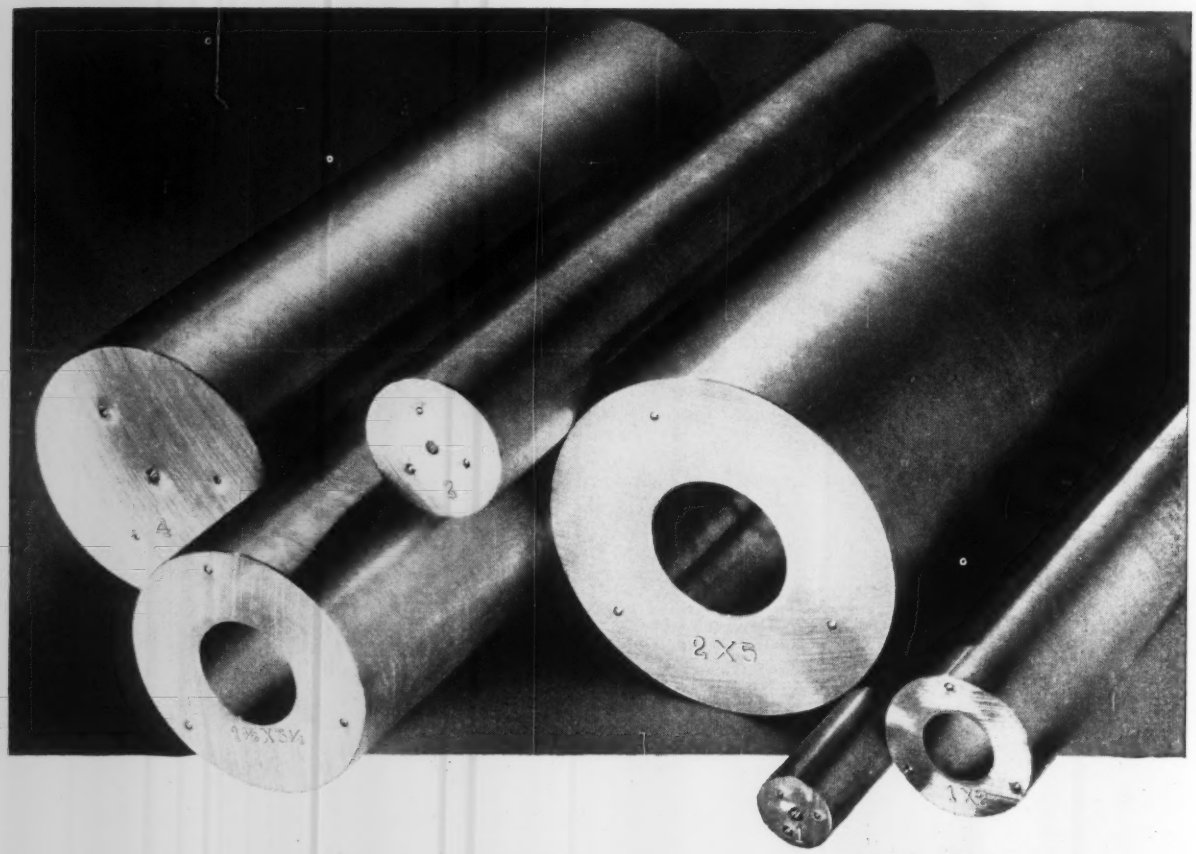
The present necessity of cutting costs and increasing production requires the most effective use of tooling and equipment. Maintaining your competitive position may be resolved by your ability to cut every possible cost corner in your processing.

A NORTHERN CRANE—in capacities up to 150 tons, and of any desired span—provides safer, faster, more dependable heavy load handling than was adequate when production schedules were lower, or when the high cost of delays was not as critical as today. You can cut many cost corners with NORTHERN CRANES.

Bulletin SE-108-A (up to 150 tons) or, Bulletin HL-115-R (up to 20 tons) will be sent at your request.

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

NORTHERN CRANES



You get **Convenience** *and* **Quality** with Johnson Bronze Bars

For your convenience, Johnson Bronze solid and cored bars are now stamped on each end with the exact size. This makes it unnecessary to remove bars from bins to check the OD for size—helps prevent errors—makes for quick inventory. Also, bars of various sizes can be stored in one bin because the size is visible which saves storage space.

In addition, the ends of all Johnson bars are centered for ease and accuracy of machining. All the operator has to do is set the chuck on the indented marks, take a 1/64" cut and he has the size bar indicated. This speeds machining, assures concentric parts since the work is always in perfect alignment. Also, Johnson bars are in the convenient 13" length—are easy to store and handle.

The quality of Johnson bronze bars is rigidly controlled from heat to heat by frequent chemical analysis. These bars are produced in permanent molds or by centrifugal casting. Either method eliminates the possibility of sand inclusions—allowing maximum uniform density.

Johnson Bronze bars are available in over 400 stock sizes. They are used extensively for making bearings, washers, thrust plates, gears, pinions, guides, rollers, sheaves, trolley wheels and other parts for original equipment and maintenance. They are quickly available from your distributor. Ask him for a folder which lists the range of sizes of cored and solid bars or write Johnson Bronze Company, 550 S. Mill Street, New Castle, Pa.

Johnson Bearings

Subsidiary: Apex Bronze Foundry Co., Oakland, Cal.

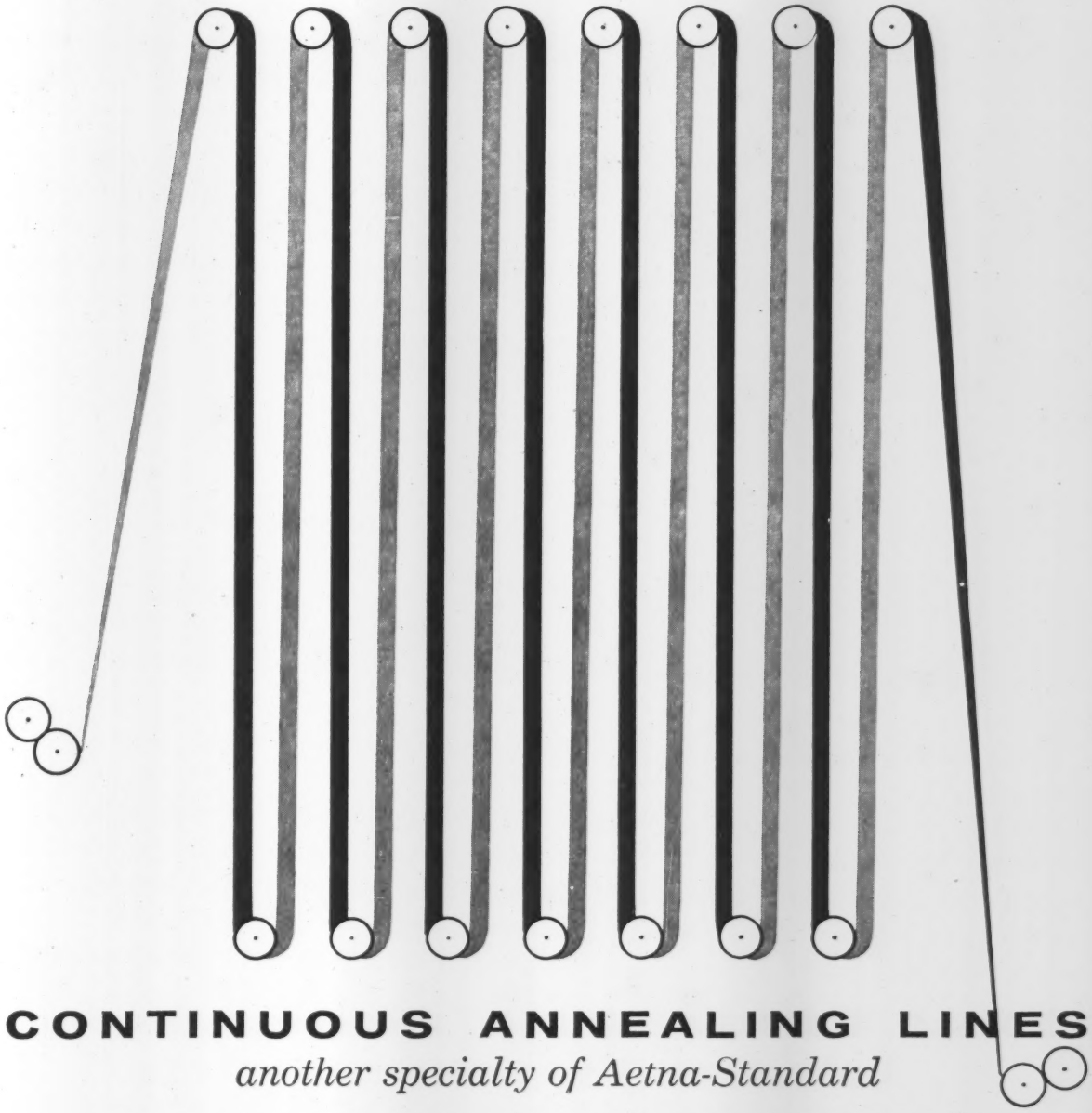
GRAPHITED
over 175 sizes

GENERAL PURPOSE
over 900 sizes

UNIVERSAL BRONZE BARS
over 400 sizes

LEDALOYL
over 400 sizes

ELECTRIC MOTOR
over 350 sizes



CONTINUOUS ANNEALING LINES

another specialty of Aetna-Standard

Like Continuous Galvanizing or Tinning, a Continuous Annealing Line requires good designing and rugged equipment.

Aetna has much experience in continuous processing lines, galvanizing, tinning and annealing. In fact, Aetna pioneered in continuous equipment. Two of the most recent high speed Aetna lines incorporate many new ideas and innovations, permitting sure tracking at high speeds of 1,000 feet and more.

What can Continuous Annealing do for your production and your costs? Aetna's sales engineers can produce some interesting figures.

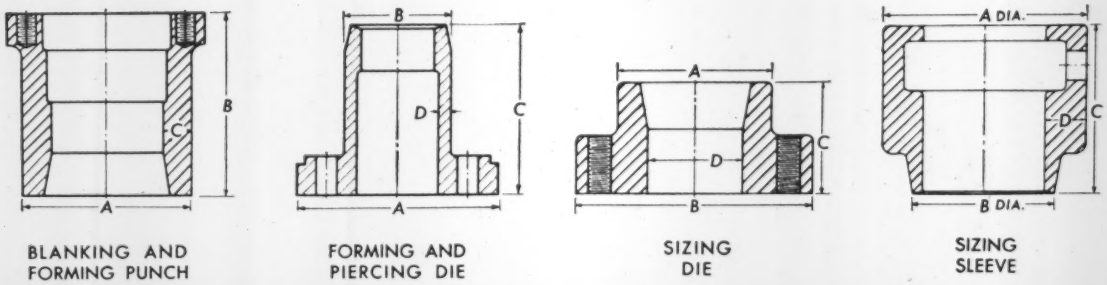
AETNA • STANDARD

THE AETNA - STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. • PLANTS: ELLWOOD CITY, PA., WARREN, OHIO • RESEARCH LABORATORY: AKRON, OHIO

CONTINUOUS GALVANIZING LINES • CONTINUOUS ANNEALING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER, PLASTIC AND CHEMICAL

Make ring-shaped tool steel parts like these faster, at less cost...

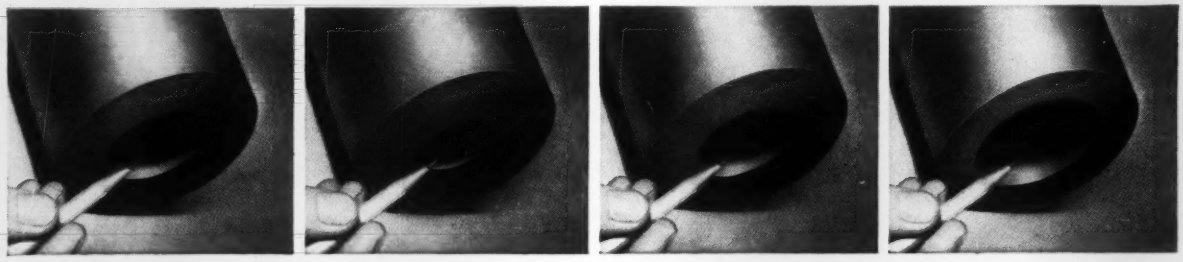


BLANKING AND FORMING PUNCH

FORMING AND PIERCING DIE

SIZING DIE

SIZING SLEEVE



Make 'em from Graph-Mo Hollow Bar® —the hole's already there

IF you're looking for a faster, more economical way to make your ring-shaped tool steel parts—and get a better finished product—here's the answer. Use Graph-Mo Hollow Bar®. Because drilling is eliminated, you cut costs and speed production. And you get a tool steel that machines faster, wears longer, gives more stability.

Graph-Mo machines faster than ordinary tool steels because of the free graphite in its structure. And there's far less tendency to pick up, scuff or gall.

Users report that Graph-Mo outwears other tool steels by 3 to 1 *on the average!* This durability results from the combination of free graphite and diamond-hard carbides in Graph-Mo's structure.

And there isn't a more stable tool steel than Graph-Mo Hollow Bar. For example: after 12 years of use, a master plug gauge machined from Graph-Mo showed less than 10 millionths of an inch dimensional change.

To make ring-shaped tool steel parts faster at less cost, specify Graph-Mo Hollow Bar. You'll have a better finished product. And you can choose Graph-Mo Hollow Bar from 3 to 16 inches in O.D. with many wall thicknesses. For more information write: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".

TIMKEN *Fine Alloy* STEEL

TRADE MARK REG. U.S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING